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Radio Control **CAR ACTION**

THE WORLD'S PREMIER R/C CAR MAGAZINE

July 1991

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Radio Control CAR ACTION

VOLUME 6, NUMBER 7

JULY 1991



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ON THE COVER: Clockwise from left: Project Yokomo tears up the track. (Photo by Steve Pond.) Losi's Junior T. (Photo courtesy of Team Losi.) Florida Winter Champs. (Photo by Steve Pond.) Cut and Trim Lexan. (Photo by Yamil Sued.) Tamiya's XR311. (Photo by John Huber.)

EDITORIAL

by STEVE POND

HERE'S A letter from an irate reader who complains that we didn't reply to a letter he sent us some time ago.

Attention: Steve Pond

I checked my computer files and dug out this letter sent to RCCA a year ago. It was ignored. I was already looking for answers to the "Frequency Frenzy" (Editorial from April '91 Car Action). Where the hell were you then!! If you actually have a response to that question, don't insult me by saying it got lost in the mail. I've found a great deal of technical information about this problem since then—without your help. You should see how I can scare the hell out of track promoters when I tell them about second- and third-order intermodulation. I've convinced many of them to ban the new odd channels. When enough people have suffered, the R/C industry will offer narrow-band equipment with dual-conversion receivers as standard equipment. Don't blame the FCC for the 75MHz massacre. They haven't properly safeguarded our exclusive use, but you don't have the facts to criticize them yet. Instead, study the approach of, and information provided by, aeronautically focused organizations and publications—and not just last week either. I guess you could say my suggestion is: knowledge is power. Get the facts and print them.

Glenn Mohler, Mohnton, PA

Glenn, my response is in two parts to address two very important issues. First, it's very unfortunate that we don't have the space or the time to answer every letter we receive. We place a high value on input from our readers and do everything in our power to get answers to your important questions. As you can see, Glenn had a very legitimate question that warrants a response. Owing to the hundreds of letters we receive every week, it's impossible to reply to every one. Regrettably, Glenn's letter was one of those that wound up on the cutting-room floor. (If it's any consolation, every letter that passes through our doors is read by our staff.) Readers' opinions help us form the editorial content of the magazine. Please keep them coming!

The second part of my response is directed toward Glenn, but it should be considered by others who feel the need to stick a broomstick in other people's spokes.

Glenn's original letter was about the new odd-number channels for use with the 75MHz radio systems, and he's managed to prove the relevance of the old adage, "If you can't dazzle 'em with brilliance, baffle 'em with bull***." Glenn was only armed with enough information to do some harm, not enough to help race directors make informed decisions of their own. The issue of the additional frequencies that have recently become available is a big one. The channels are closer than the tolerances in the radio system allow, and there's a potential for more problems with interference. But approaching the situation half-cocked isn't the answer. If handled properly, the additional channels will be a great asset to R/C cars.

Second- and third-order intermodulation isn't new. It's been around since the inception of R/C, and it isn't the result of the new frequencies. Narrow-band equipment may be the way to go in the future, but it's slightly more expensive. Dual-conversion (according to my sources) isn't necessary at all.

A prime example of the harm that can come from erroneous information like that presented by Mr. Mohler about dual-conversion radio is what happened with R/C model airplanes. Vigilantes who approached the narrow-band issue like Mr. Mohler convinced many clubs to outlaw anything but dual-conversion equipment. There is, however, AM single-conversion equipment that meets the new tolerance standards, and it's less expensive. Essentially, the actions of the uninformed have forced many of us to spend more for equipment than is actually necessary.

The moral of the story? Get *all* the facts before you commit them to print. Analyze all the options with the new frequencies; *then* make the most equitable decision—one that will benefit the entire sport.

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Group Publisher LOUIS V. DeFRANCESCO JR.

Publisher DR. LOUIS V. DeFRANCESCO

Associate Publisher YVONNE M. MICIK

Executive Editor STEVE POND

Managing Editor LI AGEN

Alleged Editor CHRIS CHIANELLI

Associate Editor JOHN HUBER

Junior Associate ALEX STROUTHOPOULOS

Copy Director LYNNE SEWELL

Copy Editors KATHERINE TOLLIVER

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Copy Editor LAURA M. KIDDER

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Art Assistants STEPHANIE L. WARZECHA
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Systems Assistants SALLY WILLIAMS
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ON JUNE 26, 1990, APPLICATION FOR ABC (AUDIT BUREAU OF CIRCULATION) MEMBERSHIP WAS FILED BY R C CAR ACTION.

LETTERS

WRITE TO US! We welcome your comments and suggestions. Letters should be addressed to "Letters," Radio Control Car Action, 251 Danbury Rd., Wilton, CT 06897. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

PRO PARTS

I own a Schumacher Pro Cat, an RC10, a JR-X2 and a 10L, but I can't find parts for my Cat. Do you know where I can order these parts? My hobby shops can't get them for me. Also, does Hyperdrive's RC10 on-road conversion kit work well? If not, can you recommend a kit that does?

SHANE SPRINKLE
Newport News, VA

Shane, the Pro Cat is now imported by

Schumacher Inc. (6302 Benjamin Rd., Suite 404, Tampa, FL 33634; Tel.: 813-889-9691). They should be able to find the parts you need. As for Hyperdrive's RC10 conversion kit, I think you're on the right track. I used it on my RC10, and I was amazed by its smoothness. For gearbox-class on-road racing, the kit's smooth belt-drive system, beam front axle and pan-car chassis are tough to beat.

JH

EVERYONE HAS TO START SOMEWHERE

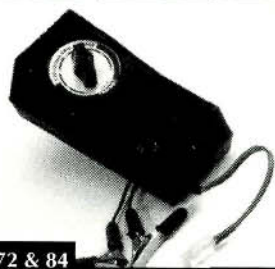
I just read the March '91 "Publisher's Page" by Louis DeFrancesco Jr., and I agree with what he says completely. "Toy"

R/C cars will help the R/C car hobby. I started that way four years ago. It began when I saw a Sears Lobo and had to have it. After that, I bought a Blackfoot, a Fox and, most recently, an RC10 that I plan to use in oval racing. Everyone has to start somewhere, and it usually depends on their budget and their R/C car experience. I think people should buy cheaper cars to gain some knowledge and then work their way up.

CHRIS OSBRINK
Alsip, IL

Chris, it's true—most of us started with "toy" R/C cars. The first car I ever drove was a friend's 1/12-scale Tamiya Toyota, but after I crashed it, he wouldn't let me

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play with it very much. Six years ago, I worked part-time at Radio Shack, and I had the opportunity to try their cars. Some were so primitive that they could hardly be controlled, but some were of the better "digital-proportional" variety. It didn't take me long to master these slow machines, and I was soon looking for better, high-performance models.

Now using sub-C rechargeables and 540-size motors, the "toy" R/C cars are much improved. Although beginners will be upset by the lack of spares and after-market parts for these cars, they'll probably move on to better, more advanced models—just like we did.

JH

WE STAND CORRECTED

In your February '91 "Letters" column, Matt Sherman asked about the availability of after-market parts for the Radio Shack Golden Arrow. Your reply wasn't correct. I bought a Golden Arrow as my first kit in 1988. I improved its performance by adding after-market parts. These included:

- Ball bearings from Tamiya (Hornet)
- Planetary gears (Hotshot)
- Tamiya cluster gears
- Tamiya front and rear wheels
- CRP adjustable motor mount

Most motors will fit, but a modified may destroy the speed controller. Many more Tamiya parts are compatible with this car

with little or no modifications. On road, my car performed as good as (or better than) many other beginner kits (including RC10s and Ultimas). Just because parts don't say "Made for Golden Arrow" doesn't mean they won't fit. Some time in a hobby shop experimenting can be very productive.

BOB GOTTSCHALK
Fort Atkinson, WI

I can't believe it! We were actually...wrrrrrrr...wrrrrrron...we were...incorrect. Bob, if you say these parts will fit the Golden Arrow, I guess they will. If anyone out there has a broken Arrow lying around, maybe Bob's ex-

(Continued on page 10)

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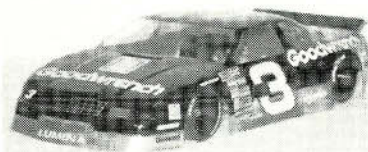
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LETTERS

(Continued from page 9)

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CC

WILL MAGIC MAN ACCEPT THE CHALLENGE?

I've been racing for about four years and I have some comments on your Joel Johnson interview. What a joke! I think Joel had better get back to the basics of R/C racing. What kind of guy would like to bury everyone in a race instead of racing side by side for the entire race. What's so bad about scoring with "chicken tracks"? I'm a co-owner of our local track. That's how we keep track of laps. Just remember, it's tracks like ours that keep R/C alive, not some hot dog like Joel.

Who cares about him picking his nose? What does that have to do with R/C racing?

I'd like to see Joel come to our track—not with all his high-dollar team stuff, but with \$1,000 or less in equipment; no pit help or anything else; just him and a car. He'd get his clock cleaned here! We have racers that are a lot better than the likes of Joel "Chicken Tracks" Johnson.

We don't need people with an attitude like that. He should give up and go to school where he belongs.

JOE SCHILLING
Sibley, IA

Mr. Schilling, calm down! Joel never said there was anything wrong with "chicken scratches," (are "chicken tracks" places to race off-road roosters?); that's just the way he used to do it in the old days. Joel even said, "We had more fun in those days," so what's the problem, Joe? I'll tell you something else: Joel is one of the best sports in the hobby; win or lose, he's always smiling and is very helpful to newcomers. He has a long-standing reputation for good sportsmanship, so don't tell me about his attitude; it's great! As for wanting to "bury" people, that's just his competitive nature. And what does picking his nose have to do with racing? you ask—a whole lot, if you do it with your trigger finger!

CC

P.S. I'll find out whether Joel is ready to accept your challenge—if you're serious. I know he will be.

KENTUCKY HAWK

I just picked up your December '90 issue and saw the Traxxas Hawk. I want to start off-road racing, so can you answer these questions?:

1. Will the Eagle hop-up parts fit the Hawk?
2. What's the fastest off-road motor?
3. Do they have championship off-road racing in Kentucky?
4. Will a Futaba 2PBKA fit the Hawk?
5. Do you think the Hawk will be a competitive off-road racing truck?

Great mag!

BENJAMIN ROWLAND
Kentucky

Ben, here are my comments:

1. Many of the important Eagle parts will fit the Hawk
2. Good question!
3. We're currently upgrading our Track Directory. Find a copy of December '90 Car Action; that was the last time Kentucky appeared and there were many listings.
4. Quite nicely!
5. I know the Hawk will be competitive, especially with the Eagle upgrades. I'm sure that yours truly will be doing a two- or three-part "Project Hawk" article (using an aluminum chassis and many of the Eagle parts, e.g., long A-arms and a TRX-Pro tranny). This Hawk will haul a...!

CC

STUMPED IN STUTTGART

I'm in the Army and am stationed in Stuttgart, Germany. I need motor spray and, as far as I know, it can't be mailed. Is there anything that can be used in place of it? Also, where can I get a list of racing rules and classes? Another problem is that not all of your advertisers publish prices with the cost of shipping and handling. If they did this, it would reduce ordering time for people in the same boat as me. I'm also looking for people in Stuttgart

who are interested in R/C. My friend and I are at the Robinson Barracks. We haven't seen anyone else with R/C cars or boats, so please publish my address so that people can find me. I don't know of any race-tracks, but we could get together, swap ideas and have fun. Thanks for the help and the great magazine.

MATT LANSING
HHC 6th ASG, Box 763
APO, NY 09154

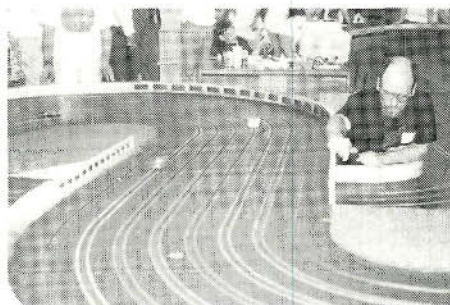
Matt, I hope this will get you the response you're looking for; somehow, I think things will work out. Don't thank us; we thank you. CC

NO PLACE TO RACE

I started in the R/C hobby two years ago when I became physically disabled. The area hobby shop used to sponsor races, but it no longer does. Why don't some of the established tracks (K&M, Island, or some of the others in the Bronx or Manhattan) have facilities for people in wheelchairs? If there's no place to race, people who are interested in the hobby will lose interest.

LARRY GREVIOUS
Bronx, NY

Larry, give Queens Off-Roaders a call at (718) 392-5766; they might be able to help you. Their track is on the first floor, and they have a ramp that goes up to the drivers' stand. Their address is: 42-12 13th St., Long Island City, NY 11101. Are all you track owners listening? We receive many letters like Larry's. It only takes a little forethought to make your facilities accessible to all racers. LA



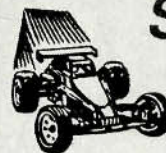
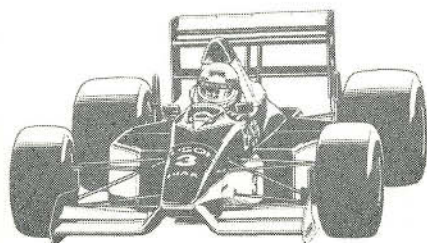
SLOT-CAR COMEBACK?

Is slot-car racing making a comeback? A track recently opened in Londonderry, NH. (I know it sounds like a little old hick town, but it's only about half an hour from Boston. We even have running water.) It costs \$1.50 for a car and \$1.50 for track time—\$3 for 15 minutes. They have two tracks: one for rented cars and one for cars that people own. The rental track has a high-banked corner, one long straightaway leading into a 90-degree turn, a hairpin and other assorted corners and straights. The racing track has no banked corners, and it's a tougher track, but it doesn't cost more. Also, is \$20 to \$60 for a car expensive? Is \$3 for 15 minutes a rip-off?

I've been an avid reader of your magazine since October '88 when I got my first subscription. Keep up the good work!

BOB PECHUSICK
Londonderry, NH

Yeah, Bob, it looks as though slot racing is making a comeback. It's a lot of fun when it's 20 degrees below zero or 110 degrees in the shade. Three dollars for time, plus a rental seems in the ballpark. Don't you get a better deal if you rent for an hour or half hour? Back in my slot-car days, my cars cost closer to \$100, and I had to scratch-build them myself! CC



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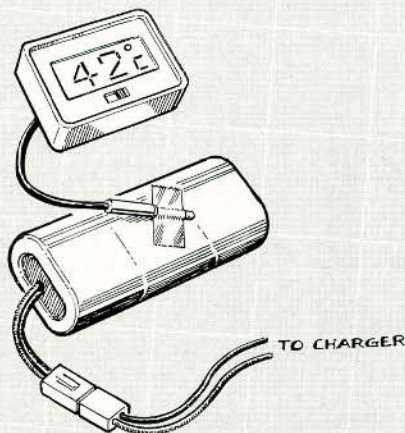
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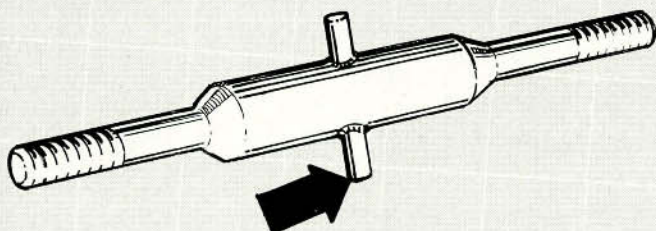
by JIM NEWMAN



THERMAL CHARGING

After a battery pack has been broken-in, you can go to thermal charging if you don't own a peak charger. LAVco says you can charge a pack at 4 amps until it reaches 42 degrees centigrade (108 degrees F) in a temperature of 70 to 90 degrees F. Tape a Radio Shack digital thermometer (part no. 277-123) to the pack as shown, and watch it until the pack reaches the required temperature. You could also rig the thermometer to activate a buzzer, which is also available from Radio Shack.

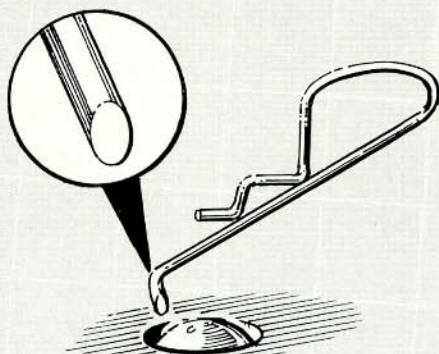
Chris Stratton, Hemet, CA



T-BAR FOR TIE RODS

It will be easier to adjust your titanium tie rods if you insert a T-bar through their holes. You can solder the bar into position or hold it with epoxy. You'll be able to make fast trackside adjustments without a special tool.

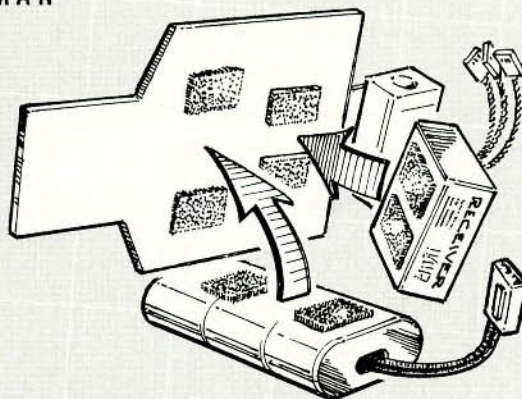
Matt Medina, Victorville, CA



BALL REMOVER

When you disassemble the MIP transmission, you'll find that three of the balls are seated in "blind" holes, which make ball removal difficult. You need this simple tool. Take a regular body clip; bend the end of one "leg" to make a 1/16-inch tang, and shorten the other leg. Now file the tang into a chisel shape, which you can slip under the bearing. Insert a small screwdriver into the loop in the body clip, and lift out the ball.

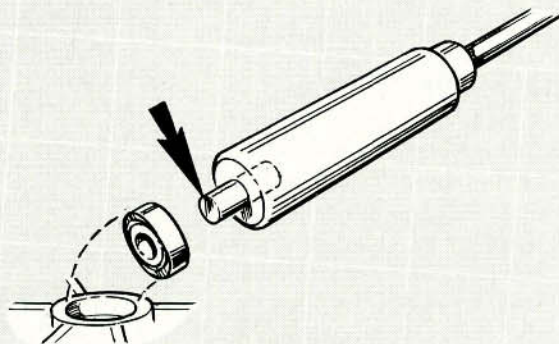
Charles Jacob, Rocky Ford, CO



QUICK-SWITCH RADIO

If you have more than one car but only one radio system, you need a quick way to swap the radio from one car to another. Simply mount the major components on Velcro®. Naturally, you should buy extra servos and keep them installed correctly in the car.

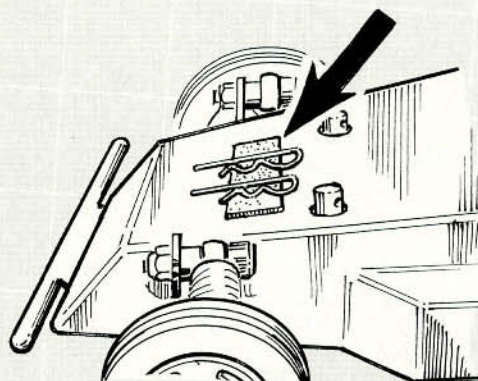
A. Berkefeld, E. Doncaster, Victoria, Australia



BEARING HOLDER

Bearings are fiddly little things to handle, but here's a helpful tip. Glue a small magnet to the handle of a screwdriver, and use it to align the bearing with the bearing housing. The screwdriver handle also makes a handy tool with which to press the bearing in.

Mike Schott, Black Jack, MO

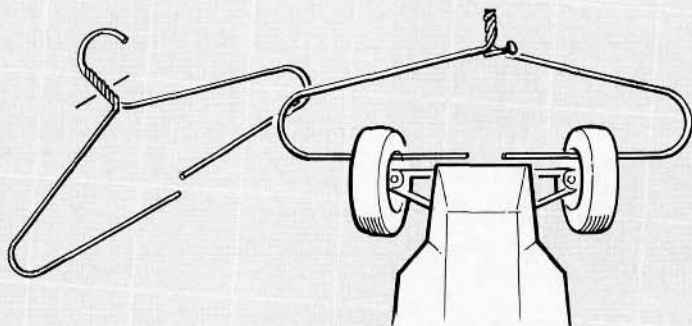


BODY-CLIP HOLDER

If you don't want to tie your body clips to the frame, but you don't want to lose them, just stick a small magnetic strip to the body shell. When you remove the clips, you can put them safely onto the magnet. The magnetic strip is available at Radio Shack.

Tiernan Vincent, Bunbury, W. Australia

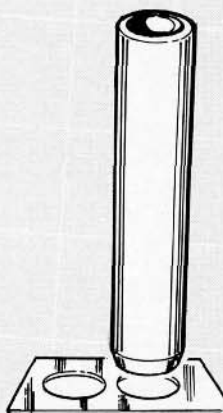
PIT TIPS



CAR HANGER

If you're short of space in your shop, why not hang up your cars? Insert a wire coat hanger, cut as shown, through the front wheels, then hang the car on a suitable nail.

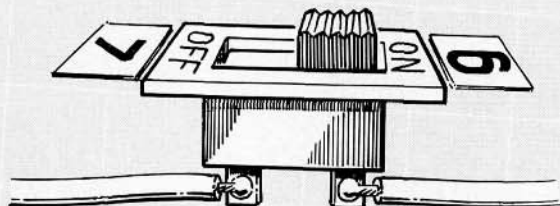
Patrick Martin, Rancho Cucamonga, CA



WASHER PUNCH

Do you need plastic washers to reinforce your body shells? With this tool, you can punch them out of scrap plastic. Buy a short piece of steel pipe, and carefully file or grind one end to make a sharp cutting edge. Put the scrap plastic on a hard surface, position the pipe, and tap it firmly with a hammer. It will punch out nice clean washers.

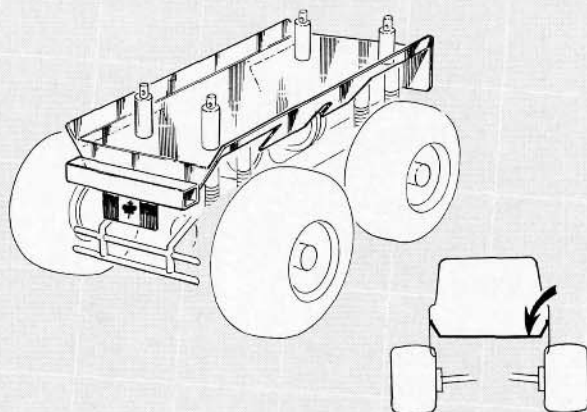
Jerry Fuerstenberg, Janesville, WI



6- TO 7-CELL SWITCHING

Some speed controllers have BEC bypass wires so that they can be used with 6 or 7 cells, but if you change batteries frequently, having to un-solder wires is inconvenient. A 75-cent Radio Shack on/off switch allows you to make the change effortlessly. "On" is for use with 6 cells, and "off" is for 7 cell cells. Just mark the switch accordingly.

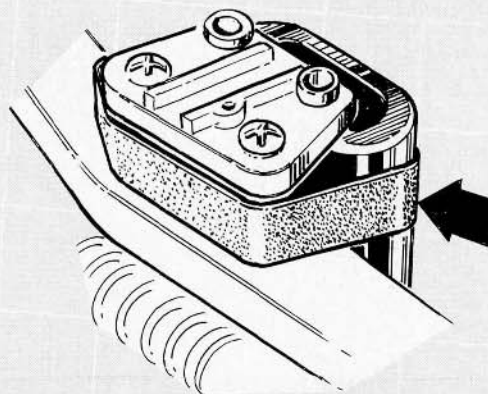
Brian Hardwick, Scotts Valley, CA



CLOD BUSTER INTERNAL MUDGUARD

Make this mudguard with strips of Plexiglas, or a similar plastic. To install it, remove your car's body shell. Notice how the side flanges are sprung against the sides of the shell to form an effective seal. This guard really reduces the amount of clean-up you have to do after running your car.

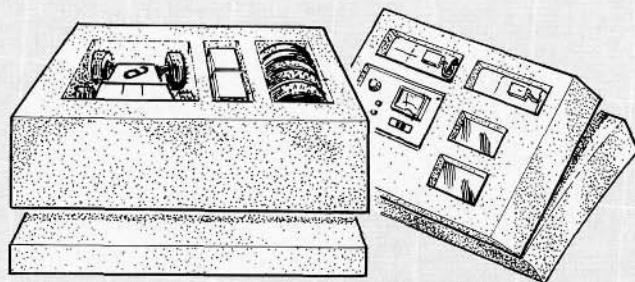
Al Jubinville, Hudson, Ontario, Canada



BLACKFOOT BATTERY SECURITY

If you hear some odd clunks each time your Blackfoot takes a jump, your battery pack might be loose. Slip a wide rubber band around the pack to hold it firmly to the chassis.

Suciu Gabriel, Portland, ME



SAFE CAR SHIPPING

To protect your equipment while travelling, try this. Buy a \$25 plastic foot locker (this one came from K-Mart), and install 2- and 6-inch foam sponge as shown. The foam is easy to cut, and you can make spaces to fit your car, charger, Ni-Cds, spare equipment, tools, etc.

Bill DuBois, Layton, UT

Radio Control Car Action will give a free one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send rough sketch to Jim Newman, c/o Radio Control Car Action, 251 Danbury Rd., Wilton, CT 06897. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we cannot acknowledge each one, nor can we return unused material.

PUBLISHER'S PAGE

GUEST EDITORIAL by CHRIS CHIANELLI



Next to the 1/10-scale off-road buggy is Parma's Super-Flex Sauber Mercedes, which sells for \$32.95, ready to run. It handles well and is super-fast right out of the box—an industry standard that has saved slot-car racing.

THE CURE HAS BEEN TESTED!

WHEN I RACED slot cars in the late '60s, if you wanted to be competitive, you had to scratch-build your own brass chassis and wind your own armatures. Custom-wound motors were available, but they were very expensive. Older guys not only had more building experience than I did, but they also had more money and could afford hot custom motors if they didn't know how to wind their own armatures. Needless to say, I had to work extremely hard to get into the A-Main and, more often than not, I didn't. Sound familiar? Slot-car racing was a money game back then, so kids like me lost interest, and slot racing all but died. Sound scary?

This March, I went to the 1991 Parma Challenge Cup at Mac's Tom Thumb Raceway in Columbus, OH, and—much to my surprise—I found that slot racing not only still exists, but has also been on the rise for the past few years. The reason for this is easy to understand: simple, but strictly enforced rules. Everyone runs the same chassis and motor, so everyone has a chance to win.

The "Flexi" classes are very popular, and there are several. Central to this resurgence is the Parma Flexi-Kar chassis. It's made of steel and costs \$9. A ready-to-race Flexi-Kar costs \$27.95, and it's competitive right out of the box. The Parma chassis isn't the only one that's legal in the Flexi classes, but Parma's race-ready car and marketing have set the industry standard.

We can learn from the story of slot-car racing and apply our knowledge to R/C racing. Do we want to play a frustrating "money game" or establish a fair "spec class"? (so to speak)—one like that which has been largely responsible for the moderate, but steady, comeback of slot racing. Isn't this living proof of the path we must take if we want R/C racing to continue to grow? Granted, the R/C industry is far larger and more complicated, and it would be difficult to obtain industry-wide agreement on racing rules, but we must try. If something like slot-car racing, which was generally considered to be doomed, can stand the test of time, imagine what we could accomplish in the world of R/C? ■

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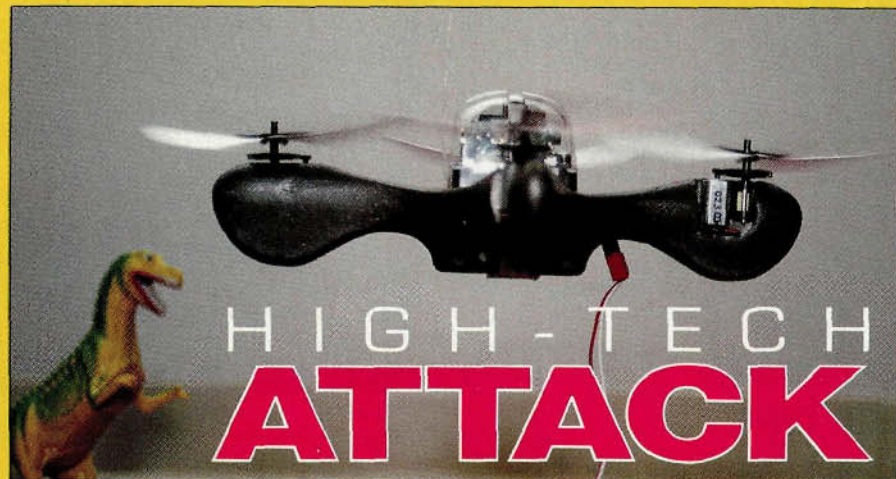
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INSIDE SCOOP

by CHRIS CHIANELLI



As directed by the Ayatollah of Radio Controlla, Commander Crash Chianelli reporting back to the faithful followers of the Grand High Exalted with pertinent information! I'm back from my latest espionage excursion with microfilm, spy shots and stolen communiques that read as follows:



four-blade contraption, allegedly manufactured by a Japanese avionics company, has a fully operational gyro under a clear dome for greater flight stability, and it has the functions of a real helicopter (roll, pitch, yaw and throttle). We had to use a 7.2V car battery with a long extension wire, since we didn't have the light Ni-Cd that should be loaded on the vehicle. This indoor R/C Gyro Saucer flies well and, as you can see, it's totally cool. Let me know if you like it, or contact Altech Marketing; they may soon be importing it. Because of its high-tech microelectronics, its suggested retail price will be somewhere between \$350 to \$450. I think we all need one, just in case Godzilla returns.

Poor Mr. T. Rex looks quite put off by this rude saucer assault from Planet Toxonia in the Silicone Solar System. Once again, the Ayatollah has the unfair

high-tech advantage (and to think poor T. Rex used his last Patriot missile hunting woolly-bo-bo—I mean woolly mammoth—lazy Cretaceous goof-off!) Anyway, this

CLODLET

Last February, at the Nuremberg International Hobby and Toy Show, I saw a Clod that always looked as if it was far away, even when I was right next to it! I thought I had eaten some rotten wiener schnitzel. I was relieved to find out it was a 1/14-scale QD Clod Buster. That's Mr. Tamiya just after he explained, "Don't worry, Chris, this is a smaller version." I suggested the name Clodlet, and suddenly, he would only speak Japanese to me as he walked away. I guess he didn't like the name. I'm thinking of writing to him to suggest "Busterling." Do you think he'll like that one?





March 2, Orlando, FL: the "Magic Man" broke a long-standing track record by almost a full lap at Lake Whippoorwill Superspeedway. Joel Johnson and Trinity motor builder Dave Willems broke the track record by 5 seconds! They used the latest left-turn-only TRC Lynx, which was equipped with a Trinity World Champion Favorite 11-turn single and powered by the newest version of Trinity's pushed cells. With this super-fast record, Joel will obviously be a favorite at the upcoming Reedy Race of Champions.

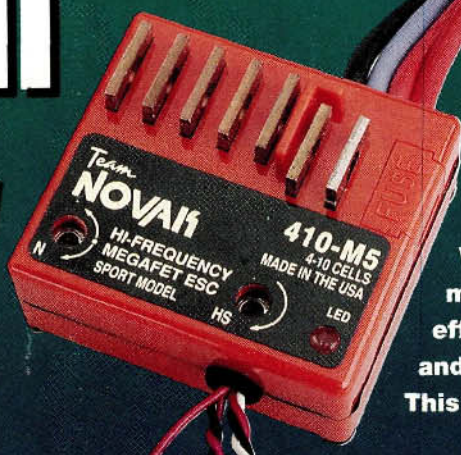


it had to happen!



It's here: Team Losi's new, economically priced, racing monster truck—the Junior-T. Based on the much researched and developed Junior Two, the Junior-T uses many of the same suspension parts as the JR-XT and JRX-Pro (national champions). The Junior-T is bound to win favor with all truck-racing nuts who are on a budget. For more facts, features and details, check out our sneak peek of the "T" on page 26. "Genius Junior" has done it again!

high FOR LOW

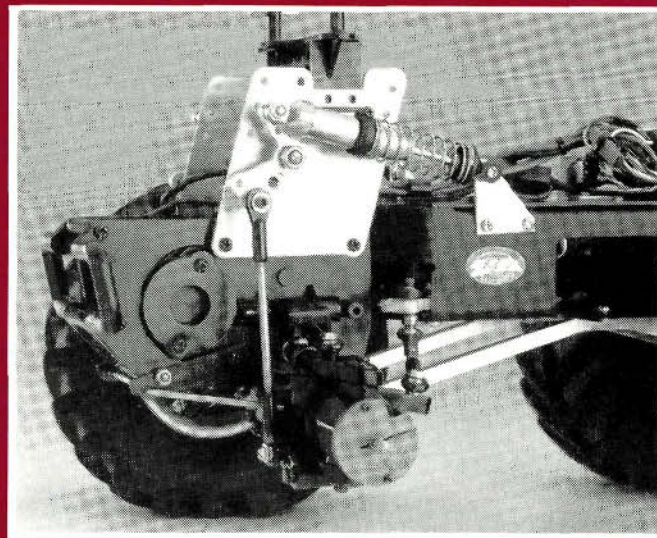


How does this sound?: a high-frequency, recharging, Megafet speed controller for \$119.95 that has a Pop-Solder-Fuse that you can repair yourself? Well, that's exactly what the Novak 410-M5 is. Novak claims the M5 offers an economical way to experience the ultra-smooth driving and efficiency of top-of-the-line Novak controllers like the M1c and MXc. With 2500Hz high-frequency pulse-width modulation, you can recharge batteries more efficiently during partial throttle and braking, and acceleration is perfectly linear and smooth. This news we like.

TITANIUM TANK TRANNY



The Pentagon categorically denies that Robinson Racing, known for its fairly priced, good-quality gear products, produces this titanium four-piece diff gear (held here by Rob) for the Abrams M-1 tank. Overwhelming leaks about Robinson's all-32-pitch cluster gears with changeable 48-pitch spurs for the extremely popular Traxxas Hawk are, however, hard to disavow. Spurs will be available in 54-, 62-, 66- and 72-tooth sizes, and cluster gears will be supported by 4x8mm bearings. Of course, these new items will also fit the Sledgehammer.



travel the U.S.A.

MaxTrax has borrowed state-of-the-art design theory from the latest full-scale monster trucks (e.g., the Bigfoot VIII and the Carolina Crusher) and applied it to the Kyosho USA-1. To improve suspension and handling, the USA-1 now has one 4-inch shock on each wheel. This cantilever-type upgrade is fully adjustable and includes shock-ratio and ride-height adjustment. The thick bellcranks are fitted with Oilite bushings, and the control links are of 5-40 hardened steel. This unit is heavy duty!

steel wheels

Not much is known about this dreaded, treaded Ford van crusher that's hot off the Kyosho assembly line...but we like it!!

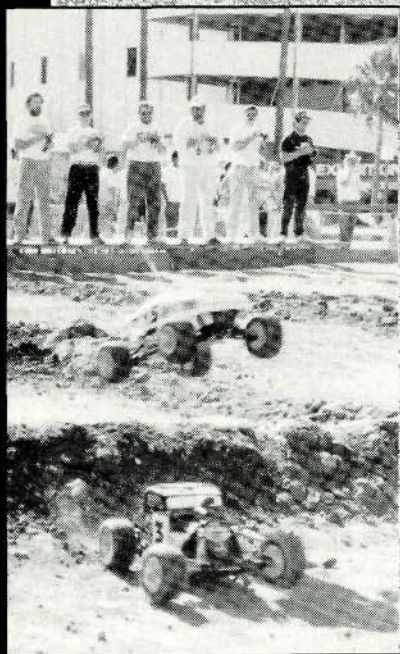
Oh, yeah, this one will definitely be imported soon; it may already be in the States by the time you read this.



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GRAND PRIX

MICKEY
THOMPSON



by MIKE LEE



PHOTOS BY MIKE LEE

The lineup of Concours entrants. Most are works of art, and this makes judging them very difficult.

WHEN WE HEAR someone talk about the Mickey Thompson Off-Road Series, most of us can relate to the rockin', sockin' action of the full-size stadium trucks, the super 1600s, the motor-cross bikes and the stadium ultralights. Who hasn't heard of "Iron Man" Ivan Stewart? Who hasn't seen the killer pickup trucks plow their way over jumps on a tight twisting track in a football stadium? These are the showpieces of the off-road race world.

Well, no doubt, many of us are inspired by the cars and trucks that we've seen in the Mickey

Thompson (MT) Series. At almost every R/C off-road track in the States, you'll find 1/10-scale bodies painted to resemble MT vehicles. Not only do R/Cers relate to this sport, but, as the National Organization for Racing Radio Control Autos

SPONSORED BY R/C CAR ACTION

2WD Stock

Fin	Qual	Driver	Laps	Time
1	9	Shane Good	12	4:03.23
2	7	Brant York	12	4:16.52
3	6	Chad Davis	12	4:19.45
4	4	Greg Dee	11	4:12.58
5	8	Mike Thompson	11	4:23.88
6	2	Paul Williams	10	4:09.80
7	1	Vincent Davis	10	4:12.76
8	3	Brian Jones	10	4:14.86
9	10	Joe Fiocca	10	4:16.66
10	5	Bart Baker	10	4:18.51



The celebrity race featured (left to right) Tommy Croft, Jerry Wechel, Jerry Dahl, Marty Coyne, Roy Chapman, Jimmy Nichols and Brian Stewart. They're all holding Traxxas Eagle trucks.

2WD Pro Stock

Fin	Qual	Driver	Laps	Time
1	8	Mike Tuntakit	13	4:19.53
2	2	Jim Gouge	12	4:04.52
3	9	Bill Ogden	12	4:07.14
4	4	Chuck Erikson	12	4:11.42
5	3	Rick Wood	12	4:12.80
6	7	Sean Masterson	12	4:13.78
7	6	David J. Potter	12	4:16.19
8	5	Bryan Barns	11	4:02.94
9	1	Curtis Stock	11	4:07.97
10	10	Wayne Tingley	4	1:29.74

Stompin'
at
the stadium



Jimmy Nichols knows a great magazine when he sees one!

(NORRCA) realized, they also want to be part of it. That's why NORRCA has been holding off-road races on the same day and at the same track as the MT Series—so that R/C car enthusiasts can be a part of the MT excitement. NORRCA also wants to show a car-loving public what R/C is all about.

This event is no small job for the NORRCA people. Not only is this R/C series very popular (meaning a lot of entrants), but the organizers also have little time to prepare the track and the racing facility. Basically, the track is set up just outside the main entrance to the stadium in which the full-scale MT races are held. The organizers have only hours to set up the track—beginning late on the night before the races, or sometime before the sun arrives

on the day of the event.

Imagine, if you can, putting up a 3,600 square-foot off-road track, complete with wooden outer barriers, AMB auto-scoring system, sign-up tables, tech-check table, announcement stand, drivers' stand and all the other junk that must be in place before you can pull off a race. They do it!

Does the effort pay off? You bet; on the day we were there, there were more than 300 entrants and

GRAND PRIX



the winners could make off with \$250 in prizes. The series follows the West Coast Mickey Thompson circuit—not a bad deal, considering that most of us race for the almighty plastic trophy most of the time.

A variety of sponsors and supporters made sure the event was more than just another race.

many more who couldn't enter because of the vast number of racers already registered. I hadn't seen so many drivers at a race since the 1990 Nationals! To top it all off, this was a five-race series in which

In the large Brake-A-Way Hobbies tent, there was an entire hobby shop; and Dan's R/C Stuff provided NORRCA with organizational support and donated products to the winners. Dan Moynihan was instrumental in getting the promotional efforts "on the streets," and he also orga-

Open Truck

Fin	Qual	Driver	Laps	Time
1	4	Gary Kyes	13	4:19.15
2	9	Brian Peterson	12	4:00.16
3	2	Mike Dunn	12	4:02.59
4	3	Billy Bradford	12	4:12.06
5	1	John Coleman	12	4:15.64
6	6	Wylder Barrows	11	4:00.22
7	8	Brian Meirowsky	11	4:04.28
8	10	Richard Payan	11	4:14.29
9	7	Gary Sellers	10	4:05.18
10	5	Anthony Munoz	1	0:32.95

4WD Open

Fin	Qual	Driver	Laps	Time
1	4	Steve Dunn	13	4:03.81
2	2	Hooper Johnson	13	4:20.42
3	8	Roger Tibbets	12	4:02.24
4	3	Tom Clark	12	4:04.60
5	7	Jessie Watson	12	4:15.58
6	6	Mark Agnello	11	4:12.12
7	5	George Johnsen	11	4:12.60
8	1	James Elliott	5	1:57.78

Novice

Fin	Qual	Driver	Laps	Time
1	8	Dave Hessing	10	4:01.02
2	1	Billy Howell	10	4:01.62
3	6	Chuck Smith	10	4:03.15
4	2	Wayne Murray	10	4:12.54
5	5	Alex Chavez	10	4:15.10
6	4	Collyn Berling	10	4:16.99
7	3	Scott Vest	10	4:18.97
8	10	Wayne Milho	9	4:21.00
9	7	Eric Blundel	8	4:17.58
10	9	Cliff Cook	3	1:32.12

Pro Stock Truck

Fin	Qual	Driver	Laps	Time
1	2	Tom Pendergast	12	4:04.36
2	1	Vince Stolo	12	4:07.13
3	8	Brian Meirowsky	12	4:08.41
4	9	Billy Bradford	12	4:13.98
5	7	Mike Greer	12	4:17.29
6	4	John Coleman	11	4:01.34
7	5	Jeremy Kortz	11	4:05.00
8	3	Kelly Bishop	11	4:11.13
9	10	Gary Kortz	11	4:12.87
10	6	Bill Ogden	8	3:26.31

2WD Open

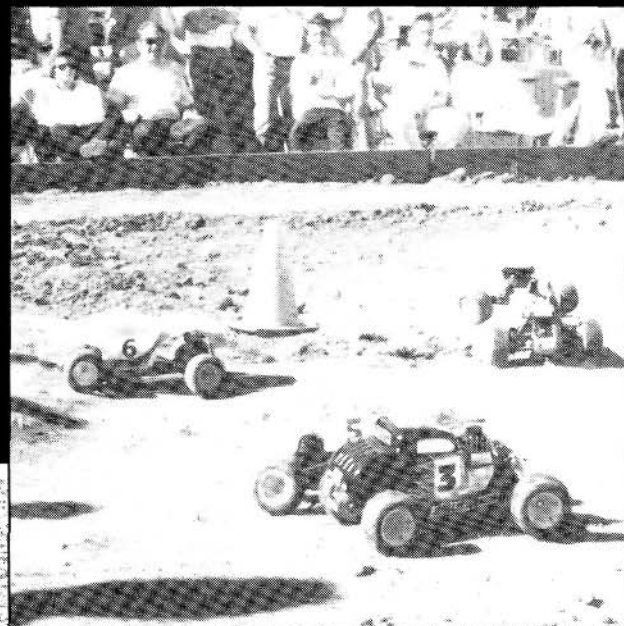
Fin	Qual	Driver	Laps	Time
1	6	Steve Dunn	12	4:09.62
2	7	Richard Dee	12	4:12.72
3	5	Andy Bartucca	12	4:16.50
4	2	Jim Gouge	12	4:17.79
5	9	Tim Hansen	12	4:20.92
6	4	Mike Dunn	12	4:21.32
7	8	Mike Tuntakit	11	3:55.76
8	3	Sean Masterson	11	4:06.16
9	10	Rick Wood	11	4:07.07
10	1	Ken Bolle	11	4:11.55

nized a couple of racing classes for some special people. In particular, Dan established a class in which drivers of the full-scale racing cars "took the wheel" of an R/C truck and competed on the miniature track. Traxxas provided the trucks; J.R. Radios provided the radio guidance; and Sanyo Batteries provided the poop. This class was very popular.

QUICK QUALIFIERS

The R/C races followed a fast-paced schedule. The action began with qualifying rounds at 8:30 a.m.! Let me tell ya; you had to come prepared to race—or else! With so many drivers registered, there was no time to waste.

There were two qualifying rounds on a very tight, narrow racecourse. Although it was advertised that the track would be like the course used by the full-scale MT



Jimmy Nichols sits behind the wheel of his Bolink Super 1600. There's no doubt that R/C is getting to be big time!

cars, its layout was nothing like the real track. It was competitive, though, and with 10 cars or trucks on the track, it was crowded, but qualifying was over by 5 p.m.

Some of the event's highlights provided exciting racing action. Gary Kyes not only found himself in good shape for the Open Class Truck A-Main, but he also found himself on top of the "Over-The-Hill-Gang"

(Continued on page 78)

Super Stock Truck

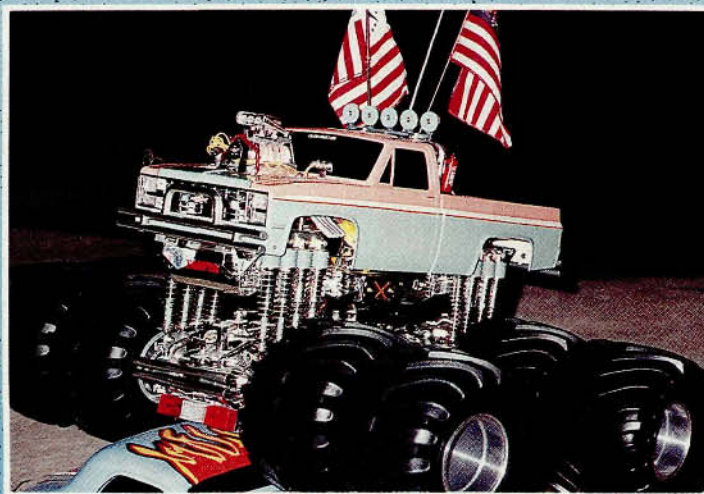
Fin	Qual	Driver	Laps	Time
1	5	Chad Cannon	12	4:09.70
2	6	Bob Sager	12	4:17.92
3	1	Mike Thompson	11	4:01.87
4	10	Tim Burton	11	4:10.36
5	4	Cliff Aldrich	11	4:12.27
6	3	Jim Gard	10	4:01.38
7	9	Wes Estes	10	4:03.12
8	7	Robert Niemela	10	4:06.02
9	8	Mark Newberry	2	1:00.36
10	2	Robert Dingman	2	2:03.62

Over-the-Hill Gang

Fin	Qual	Driver	Laps	Time
1	4	Gary Kyes	13	4:18.75
2	6	Gary Kortz	12	4:09.92
3	3	Gary McAllister	11	4:08.83
4	5	Ernie Prince	11	4:19.16
5	1	John Gudvangen Sr.	11	4:25.17
6	2	Dan Moynihan	9	4:26.52
7	7	Chuck Mann	8	3:23.22
DNS	8	Mike Lee	—	—

READERS' RIDES

"Readers' Rides" is our way of recognizing the unique, innovative—and sometimes bizarre!—vehicles that our readers have created. Send us a sharp, uncluttered, well-exposed color photo of your car or truck (no Polaroids, please!), along with a brief description, to Readers' Rides, R/C Car Action, 251 Danbury Rd., Wilton, CT 06897. If the Ayatollah chooses your photo, you'll receive a one-year subscription to Car Action, or an extension to your existing subscription. You'll also be eligible for the third annual "Reader's Ride of the Year Contest" in the fall of 1991. Write your address and phone number on your letter and on the back of each photo you send, in case we need to contact you.



LADY'S CHOICE

Sharlene Marschall of Moorpark, CA, is the bad boy on her block, so to speak. Tired of people running over her Monster Beetle, she decided to get tough, so she and her husband, Wolfgang, went to work on a Clod Buster body. They added lots of chrome and aluminum parts, a $\frac{1}{10}$ -scale Parma hemi engine, eight-wide wheels (with two specially made truss bars for support and four shocks each) and a super-heavy-duty steering servo—too many hop-ups to list, really! Now, when Sharlene takes her Clod out to play, the boys "pack it in"!



NOTHIN' BEATS A BUD!

Bob Humphrey of Cincinnati, OH, must be a big fan of the Mickey Thompson Stadium Series, because he decided to copy the paint scheme of Roger Mears' car. (Roger is the brother of Indy Car driver Rick Mears.) To a JR-XT, Bob added a set of jet-black HPI rims, standard Losi rubbers and a Race Prep Chi-Town Hustler motor. For control, he chose a radio and an electronic speed controller from Futaba.



MELTDOWN!

John Letcher of Millbrae, CA, custom-built this replica of a tough, turbine-powered sled puller. To a frame made of $2 \times \frac{1}{4}$ -inch aluminum, he added a Wild Willys Jeep tranny, an AstroFlight Pullmaster motor, 14 cells and a set of Clod Buster tires and rims. He used PVC pipe for the nose, plumbing pipe for the exhaust and a sheet of ABS plastic for the rear fender. Final touches include an old Wild Willys driver and a set of gauges from Tatone Scale Instruments.



FANTASTIC FERRARI

All the way from Wunsiedel, Germany, comes this rad shot of Alexander Ordnung's new 1/10-scale Kyosho F40. Based on the Ultima II chassis, this car handles the road almost as well as the "real thing." To give it the speed necessary to

live up to its name, Alexander added a Trinity Triad 11-turn motor, a Novak T-1X ESC and a Trinity Pushed 1700mAh SCE battery pack. With this potent package, he can smoke anything on the road—short of a *real* F40, of course!



MIGHTY MEAN MACHINE

From the "Team Sooka" racing stables comes this trick Kyosho Turbo Optima Special Edition. Fred Berg of Copperas Cove, TX, equipped this mean machine with a Tekin 411P, an SRS stretched graphite chassis, a Futaba Magnum and a Trinity 10-turn Triad motor—definitely the right combination for speed. A Dahm's Razor body with undertray keeps the dirt out and the electronics in. Nice job, Fred!

SNAKE BITE!

"It lives!! My experiment in cross-breeding inanimate graphite, plastic and aluminum with very rare reptiles is a complete success!" Jimbo Hall of Ararheim Hills, CA, has upset the scientific world with this creation—a green-scaled, purple-backed, fire-breathing, tire-biting lizard! Under the skin of this half-breed Kyosho Lazer ZX are a Novak 410-MXC ESC, a Futaba Magnum and a Reedy Esprit Ultimate 4 motor. Run for your lives; it's alive!



BEACH PATROL

Mark Herod cruises the shores of San Diego with his beach-patrol vehicle, "Orange Rush." He uses a Twister Pocket Rocket motor to give his King Cab more speed, but the bulk of his mods were to the body: He added handmade surfboards, utility racks, sideview mirrors, rescue flotation devices—even light bars made from plastic razor-blade covers! The final touch?—a set of Sees sparkling, directional, spoked aluminum wheels. Hittin' the beach in style is easy with a rad truck like this!



Sneak Peek!



*Pity da fool dat don't
buy dis truck*

TEAM LOSI'S

Junior T

by JOHN HUBER

THE NEWEST ADDITION to Losi's line of cars and trucks is the Junior T racing truck. The Junior T is based on the design of the other Junior series cars but, like the Junior Two, it's aimed at entry-level racers who want a good price and the option to upgrade as desired.

The Junior T features the new molded chassis, H-arm rear suspension, oil-filled shocks and bellcrank steering. So that you won't confuse it with its big brother, the JR-XT, the Junior T has new one-piece rims and an awesome Ford Bronco body. Ball bearings are included for the gearbox, and the axles have bushings made of a special plastic.

With so many race-bred features, the Junior T is sure to be a great performer. If you're looking for a good truck to start racing, this might be just the ticket.



The Junior T has all the budget features found on the Junior Two, plus all-new one-piece rims and a Ford Bronco body.

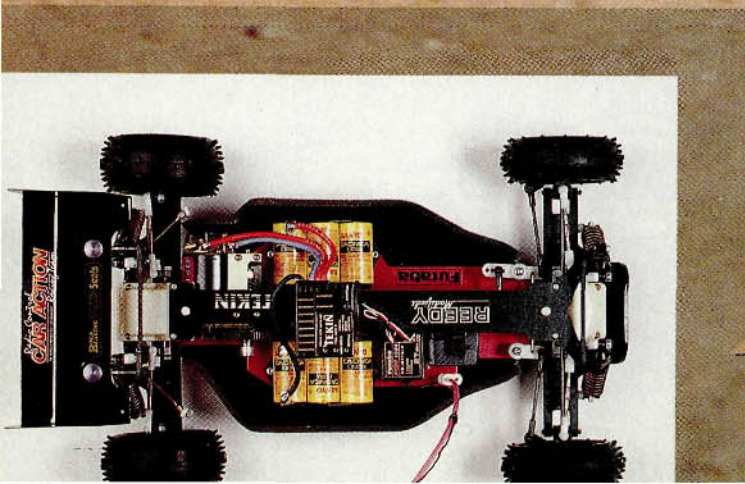
Look for a detailed "Track Report" soon in *Radio Control Car Action*!

**Here's the address of the company featured in this preview:
Team Losi, 13848 Magnolia Ave., Chino, CA 91710.*

P Y R O K J



by STEVE POND



Yoked

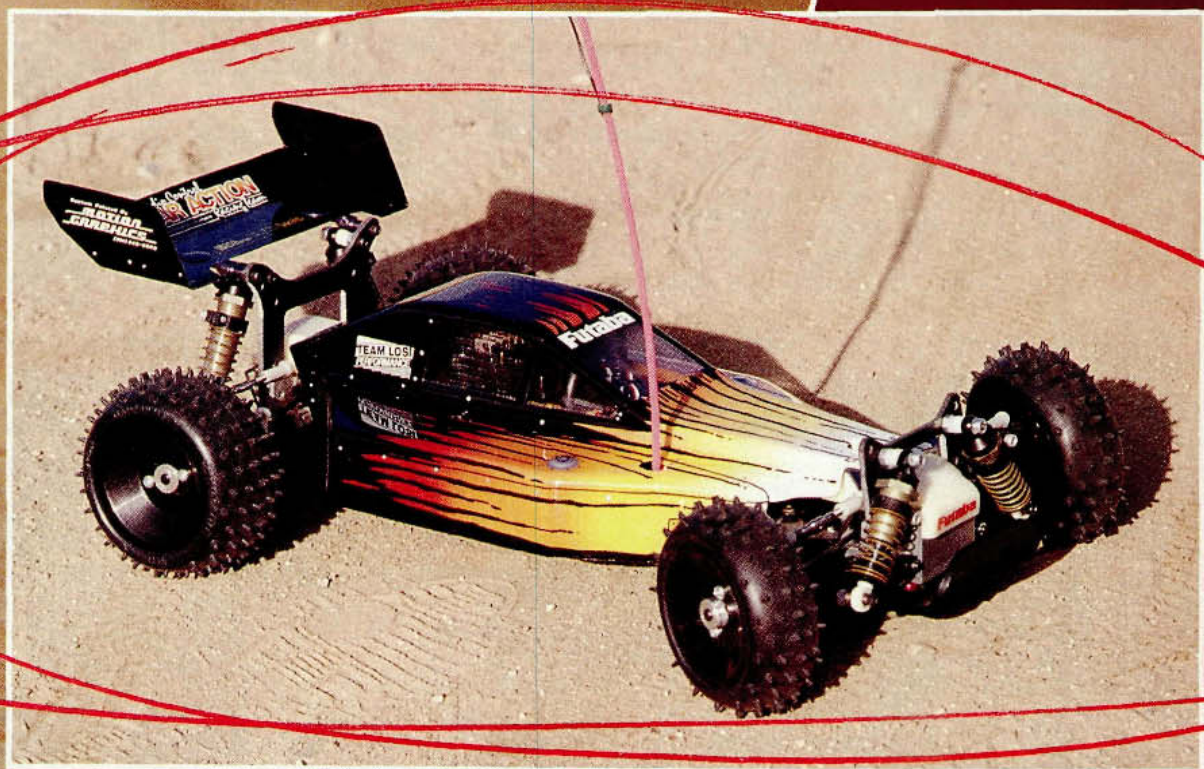
COMO

ORIGINALLY released in 1988, the Yokomo® Super Dogfighter (known as the YZ-10 in the States) has been considered one of the best 4WD off-road cars ever introduced. It has enjoyed a string of successes that rival those of any other 4WD. Its list of R/C racing credits includes almost every major title, the most significant of which is 1989 IFMAR World Champion.

Driven by Masami Hirose of Japan, the YZ-10 streaked to victory in Sydney, Australia, against the toughest competition in the world.

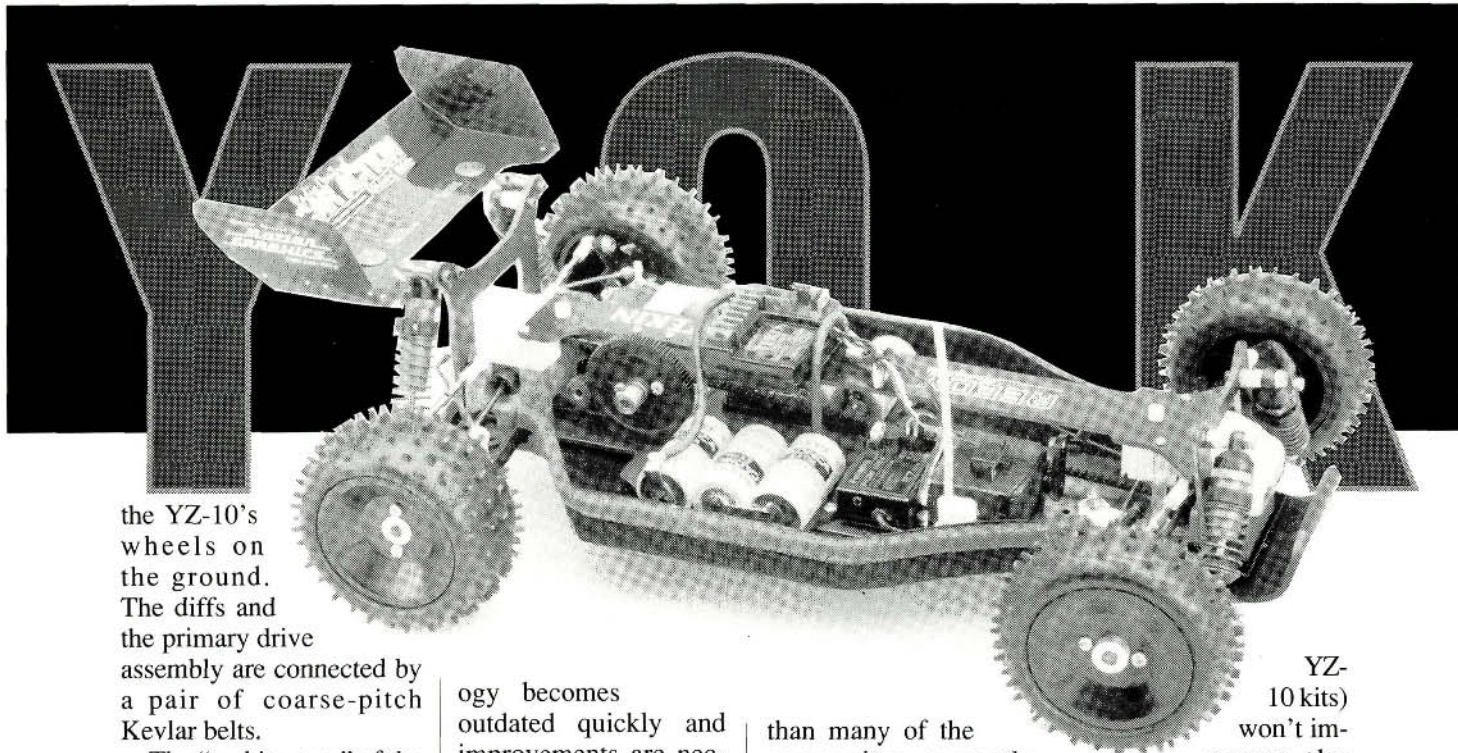
The YZ-10 has all the ingredients of a successful racing machine. Its fiberglass chassis is designed to accept a saddle-pack battery—a configuration that's ideal for off-road racing. It has ultralight magnesium bulkheads at either end of its chassis plate, and

its center bulkhead is also of magnesium. Inside the center bulkhead is the primary drive assembly, which includes a slipper clutch that drives the front wheels and a spur-gear assembly that can be set up as direct-drive (for high-bite tracks), or as a one-way bearing assembly in the spur gear (for improved turn-in on low-traction surfaces). Ball differentials inside the front and rear bulkheads keep



PHOTOS BY STEVE POND

motivation



the YZ-10's wheels on the ground. The diffs and the primary drive assembly are connected by a pair of coarse-pitch Kevlar belts.

The "architecture" of the YZ-10's suspension is typical of what's found on most high-tech racers. Its ultra-rigid lower suspension arms have adjustable upper links and universal-joint drive shafts to transfer the power to the wheels, and its oil-damped, coil-over shocks soak up the bumps.

With such an impressive résumé, it's hard to believe that the YZ-10 could ever need improvement, but it does. There's no doubt that it was one of the most advanced R/C racers of its day, but racing-car technol-

ogy becomes outdated quickly and improvements are necessary to keep the cars competitive. To improve its performance, I modified the YZ-10 using some of the new R/C technology.

FROM THE BOTTOM UP...

I replaced the original chassis with one from Corally*. Made of an aluminum alloy called "Coral" (it was developed by the aerospace industry), the chassis is reported to have a better strength-to-weight ratio

than many of the composites currently used. It also has the unique bolt-in battery trays that have been used on Corally's on-road cars, and this makes installing saddle-pack batteries a breeze.

I replaced the front and rear magnesium bulkheads with factory-made aluminum units. The magnesium bulkheads are very light, but they're also likely to break during hard crashes. Although the aluminum units (which are now included in the

YZ-10 kits) won't improve the car's performance, they're far less likely to break. I kept the center magnesium bulkhead because it isn't located in a high-stress area.

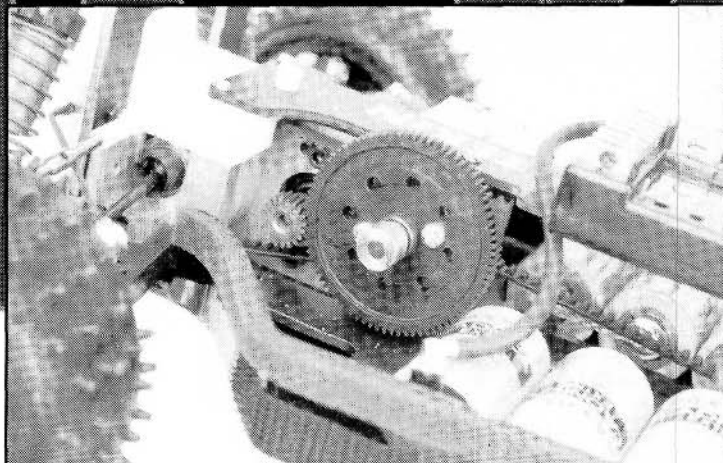
The rear aluminum bulkhead needs some type of belt-tension adjustment. When you assemble the transmission according to its instructions, the belt has a tremendous amount of slack. It didn't "skip" during the test runs, but this lack of tension might cause it to wear

DOGFIGHTER DEVELOPMENTS

Although Yokomo's original Dogfighter was once on the cutting edge of R/C racing technology, it's an "antique" by today's performance standards. In 1985, a young R/C racer by the name of Gil Losi Jr. won the first-ever IFMAR World Championships in Del Mar, CA, with the equivalent of the Yokomo SE (special edition).

The SE had a fiberglass-plate chassis and a 4WD independent suspension. The rear of the suspension consisted of trailing arms with separate oil-filled shocks, and its front featured an A-arm design damped by a single monoshock. The car had a central slipper assembly that was connected to the front and the rear by a chain drive, and it had a rear differential that greatly improved its handling. Instead of a





To allow the use of Robinson's spur gears, the stock spur gear and single one-way bearing were replaced with Yokomo dual one-way-bearings, which prevent slippage on the shaft during heavy acceleration.

prematurely. I chose to take my chances with it, but if that idea doesn't sit well with you, RPM* offers injection-molded bulkheads that feature eccentric belt-tension adjustment for the front and the rear.

Both the stock chassis and the Corally chassis have L-shaped backbone stiffeners that you bolt to the chassis. Although they increase chassis rigidity, the chassis still flexes slightly. This affects the front drive belt's tension

greatly, and this could cause the belt to fail prematurely. The most important improvement that can be made to this car is the addition of a Jammin' Jay's* chassis "stiffener." The stiffener is a graphite upper plate that you attach to the tops of the bulkheads, and it virtually eliminates all the flexing in the finished chassis assembly. It also gives the front shock tower extra support. At the point where the plate is attached to the front bulk-

head, it forks outward and rests on the back of the front shock tower. This setup will prevent the tower and the front bulkhead from being damaged during hard crashes.

Attaching the upper plate to the stock bulkheads, however, requires a little work. The front bulkhead's plastic cap has a slight pitch. Because of this, the plate bows upward when you attach it to the chassis. To solve this, I used a milling machine to flat-

front-end differential, which, at that point wasn't a consideration, this car relied on something really unique—one-way bearings. These bearings allowed the outside front wheel to rotate freely when the car was cornering.

Some of its other features included NMB ball bearings; hardened front drive shafts (to take the punishment from the one-way bearings); a high-performance Yokomo 05 stock-class motor; special Team Losi tires; and a new shock designed with the rigors of off-road racing in mind.

Yokomo has continued to improve on the SE. After stumbling in the 1987 World Championships, the company came back with a vengeance in 1989 when Masami Hirose raced the Super Dogfighter to victory. What's next is anyone's guess, but based on its track record, Yokomo won't be sitting still for long—keep your eyes peeled!

PARTS LIST

ASSOCIATED ELECTRICS

Pro shocks F 6434, R 6432
Pure silicone shock oil 5410, 5416
Green springs 6480, 6494

BOCA BEARINGS

YZ-10 bearing set 05-35US

DU-MOR R/C

Corally YZ-10 chassis 43000

FUTABA

1024 27MHz PCM radio 3PB27MHz
BB servo S9101

HPI

Wing mounts A-MA 009
Wing buttons A-MA 008

JAMMIN' JAY'S

Upper plate chassis stiffener J-501
Ball differentials J-150

MOTION GRAPHICS

Custom paint job

PRO-LINE

2-inch tires 7035, 7060

RPM

Steering blocks 7510
Rear hub carriers 7515

REEDY MODIFIEDS

"Mr. H" 12-turn motor 507

ROBINSON RACING

81-tooth spur gear RRP2081

TEAM LOSI

Pinion gears 4120
Prime Time matched 1700s 6200

TECNACRAFT

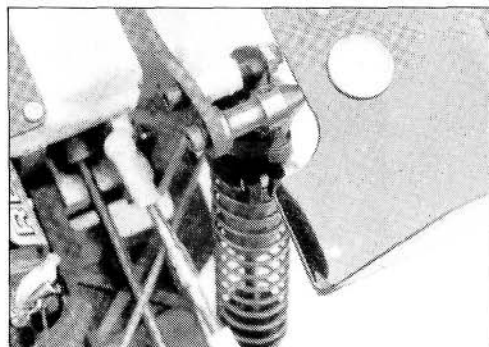
Ti-Rods titanium linkage kit 1206W

TEKIN ELECTRONICS

420F electronic speed controller ... TSC420F

YOKOMO

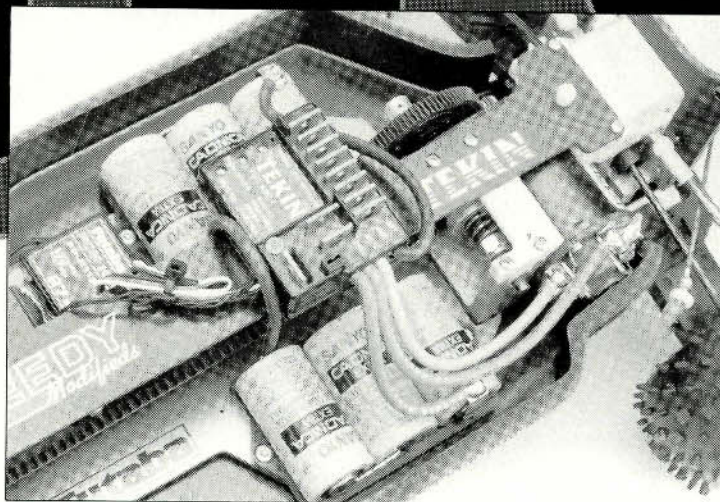
Wide front universal shafts ZC422
Ball ends ZC206
Spur-gear adapter with double one-way bearings ZC641S



The Yokomo's wing was mounted on the rear shock tower with HPI's wing mounts and buttons. They enable you to mount the wing more rigidly because they're drilled to accept heavy wing wire.

YOKO

Mounted to the Jammin' Jay's chassis brace is Tekin's new 420F ESC. Power is supplied by Team Losi Prime Time SCE matched cells.



ten the cap so that the upper plate would sit properly. (You can do the same thing with an X-Acto knife and a steady hand; I just like the precision of the milling machine.) I also had to remove the raised, "Yokomo" letters on the center bulkhead cap.

I kept the YZ-10's original fiberglass shock towers. Graphite shock towers are available but, in my opinion, they're too rigid. Fiberglass is much more flexible, and it offers more bulkhead protection.

DRIVE HARDWARE

The list of drive-hardware updates starts with a complete set of Boca Bearing* Ultra Seal ball bearings. The YZ-10's original ball bearings worked well for short periods, but when used for a long time, they start to fall like flies. Boca's bearings have unique seals, and to maintain them, all you have to do is blast the dust off with compressed air.

I only made a few changes to the primary drive assembly to bring it up to par, but they were expensive. The original one-way bearing assembly that I mentioned earlier allows the car to run well on the low-bite surfaces. When

the car was introduced, this assembly was more than adequate, but the demands of today's megapower motors cause it to slip on its shaft during acceleration. Yokomo's new bearing assembly (available as an option) has two one-way bearings for increased strength under acceleration. This assembly also eliminates the need for odd-size spur gears and allows you to use most of the popular after-market gears that are available in the U.S.

I used the YZ-10's stock primary drive shaft, the standard belts and the front slipper. Yokomo offers a fine-pitch belt conversion kit, but it should be stressed that this system was designed with the 5-minute races of Europe and Japan in mind. The motors that we use in our modified 4-minute races are more powerful and put more demands on the belt. I recommend that you keep the coarse-pitch belt assembly.

I used Jammin' Jay's Yokomo diff kits. Each kit includes a set of diff halves and a pair of Jammin' Jay's diff rings for each diff. The diff halves have the same

configuration as the standard Yokomo hardware, except for the flat spots that have been machined in their ring seats. These spots index the surface-ground rings to the diff halves for slip-free operation.

I also used Team Losi* TC 1/8-inch diff balls and 5/64-inch balls for the thrust bearings. I replaced the rear diff pulley with a stock Yokomo front pulley. The front pulley has a double flange, while the standard rear pulley has only a single flange. When the rear belt isn't perfectly aligned, it tends to ride on the "unflanged" side of the pulley, and this damages the belt. The double-flanged pulley prevents this from happening.

On the car's rear end, I used the stock universal drive shafts, but I replaced the rear hub carriers. They're made of the same light magnesium as the bulkheads, which, as I mentioned, breaks under stress. I used RPM injection-

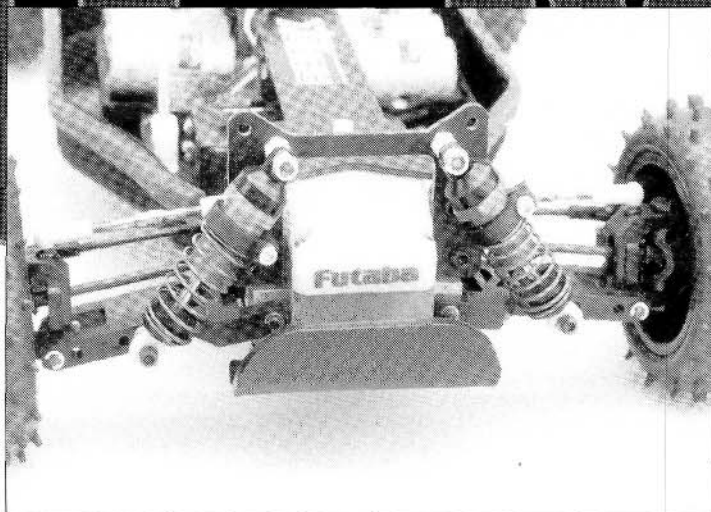
molded hub carriers which allow some flexing.

FRONT END

I updated the YZ-10's front end with Yokomo's wide front-end kit, which includes longer front drive shafts and new wheel-mounting hubs. There are two holes in the front A-arm where the steering hub carriers can be attached. When you're using the stock setup, you have to attach the carriers by using the inner holes. The long universal-joint drive shafts allow you to move the steering-block carriers to the outer holes.

The wheel-mounting hubs are designed to move the front wheels inward, and this neutralizes the effect of longer front arms. By moving the wheels inward, the tires' centers are closer to the kingpin (the point where the steering block pivots). The closer the tires' centers are to this point, the less tire "scrub" there will be

COMMO



Team Associated's new hard-anodized shocks provide ultra-smooth operation. Up front, .56-inch shocks were used, and 1.02-inch shocks were used on the rear.

when the car turns. This kit doesn't actually make the front wider, it just modifies the front for improved steering response. I also replaced the stock magnesium steering blocks with some from RPM.

To increase the suspension travel, I had to modify the stock linkage. The supplied large rod ends are very strong, but they limit the amount of suspension travel to the point where it affects the car's handling. On the front end, I replaced the outer rod ends (where the linkage is attached to the steering-block carriers) with Yokomo's smaller snap-on rod ends and pivot balls. Because these rod ends provide a greater range of motion, I replaced all four of the rear rod ends with them. The stock ends would have interfered with the bulkhead when the suspension was extended. I replaced all the stock linkages with Tecna-craft's* Ti-Rod titanium linkages; they're

easier to adjust and much stronger than the stock rods.

The most important suspension update was the addition of Associated's* new hard-anodized Team shocks. They're available in two lengths for the front and the rear, and the YZ-10 needs the shorter set of each. These shocks are a tremendous improvement over the original units as far as consistency and performance go, and they increase the suspension travel slightly. The shocks can be mounted using all the stock hardware, but for shock-tower clearance, I had to install an 1/8-inch spacer behind each mount.

I filled the front shocks with Associated silicone 40WT oil, and the rears with silicone 30WT—an oil combination that works well on bumpy tracks. For smooth tracks that require more traction, drop 10 points on the oil in the front and the rear. I fitted each with

Associated's optional green springs.

WHEELS

To put the power to the ground, I use the stock Yokomo wheels (dyed black) with a set of Pro-Line* off-road tires. These tires feature a unique tread pattern that's designed for medium- to high-bite surfaces. Their outer rows of spikes have the standard pin design and are long enough to cut through fluff and get to solid ground. Their center rows of spikes have a small paddle-type design that runs across the tires' faces. The small paddles provide excellent straight-line traction, but their narrow profile allows for a little slip during turns. This makes the tires ideal for high-bite surfaces where "traction rolling" is a problem.

THE GEAR

The demands placed on the gear by a modified 4WD car are extremely stringent, so this project needed topnotch electronics. To power the Tekin* 420F speed controller, I use Team Losi Top 10 matched SCE batteries, in which only

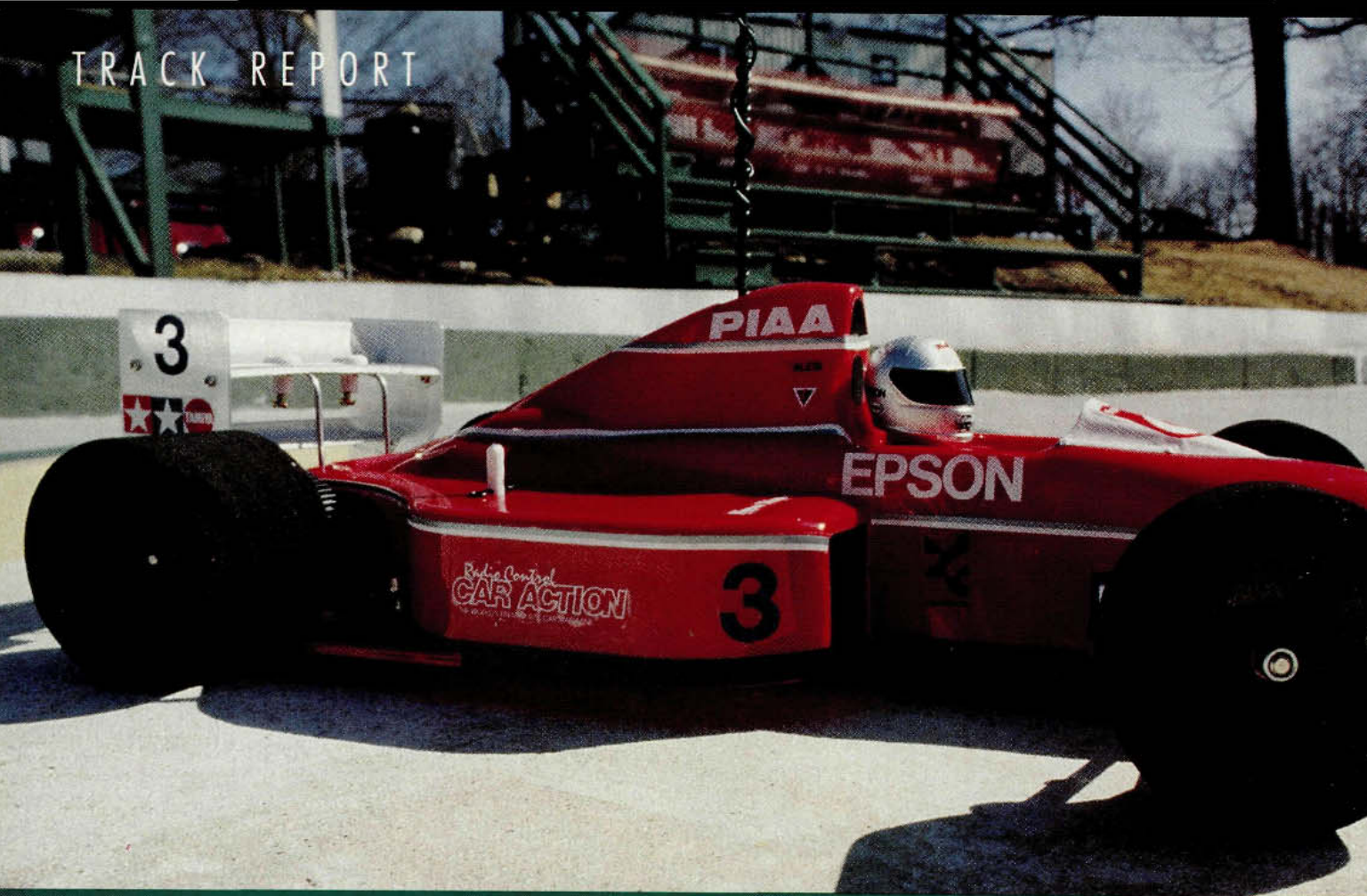
the top 10 percent of all the cells tested are used. The 420 is an update of Tekin's model 700, and it has the same regenerating circuitry, torque control and smooth power delivery as the Tekin 411P, but it has higher amperage limits and lower voltage loss. The 420 provides the juice to a Reedy* Ultra Series "Mr. H" 12-turn, triple-wind motor. The motor is connected to the drive train by Losi pinion gears and a Robinson Racing* 81-tooth molded spur.

I use Futaba's* new 27-band Magnum PCM radio for guidance. The 27-band version takes the PCM's obvious advantages one step further. Earlier 75-band PCM versions did a good job of rejecting interference, but the 27-band is even better. The radio is combined with a Futaba S9101 steering servo for a little extra power and quicker response.

BLAZIN' BODY

For the finishing touch, the Yokomo needed a painted body. Disliking the job as much as I do, I sent a clear body to Motion Graphics*. Using a picture of a full-size car from a magazine as a

(Continued on page 86)



T A M I Y A
 TYRRELL 019
FORD

b y P E T E S C H E N K

CAN YOU REMEMBER the first time you built a model?—how you wanted to build the best that you could. Well, I work at Air Age Publishing, and after seeing countless cars entering and leaving the building, I started to bug Editor Steve Pond for a car to build. After some pestering, he eventually gave me the Tamiya* Tyrrell 019 Ford to review. It's an on-road, open-wheel car that's perfect for driving on smooth parking lots.

I hadn't built a model for 10 years, so I know that if I could build this model, anyone—with little or no experience—could build this Tyrrell 019. It's a beginner-level car, with step-by-step, easy-to-follow instructions. As with anything you've never done before, you might run into a few problems, but nothing too serious. Don't be afraid to ask for help at your local hobby shop—or ask your friends; that's what they're for.



PHOTOS BY JOHN HUBER



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THE KIT

Before you start to assemble the Ford, read the instructions carefully, become familiar with all its parts, and be sure you have all the tools you'll need. (These are all listed on page 1 of the instruction book.) Nothing too special is needed—just a couple of screwdrivers and a knife. No radio system, batteries, or speed controller is included with the kit. (I've seen some of the mechanical speed controllers used in other cars, and was glad I'd be using an electronic one for this review.)

The supplied body is clear and very detailed, and there's a full set of decals that you can add when the body has been painted.

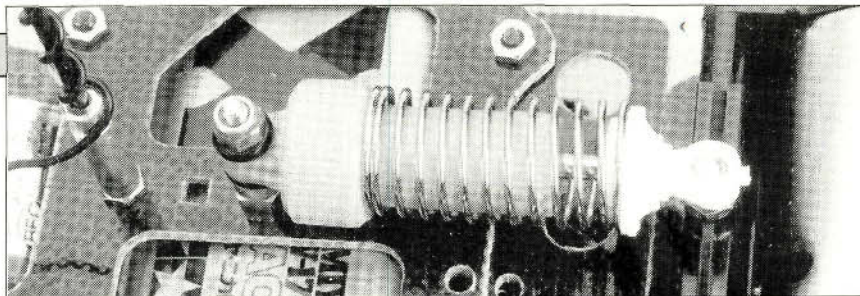
Take your time, and allow at least three nights to assemble and paint this awesome, fast-moving fury. The instructions are quite specific, and you should pay attention to the illustrations. Assemble the car in a safe area where nothing will be disturbed, because you'll have many bags of loose parts that you don't want to lose.

ASSEMBLY

First, put the foam tires on the rims, using double-sided tape to hold them. Apply the tape to the rim with the outer side still protected by the backing. When you've carefully stretched a tire over a rim, remove the tape's backing, and the tire is there for good. Be careful: foam tires can tear.

Assemble the chassis and the drive train. Have all the parts in front of you before you start, follow the instructions, and don't jump ahead. When you've cut the parts off the parts tree, shave off any little plastic bits that might still be hanging on them. (There were many in step no. 4: gear-case assembly.) Though this might not affect handling, it improves the car's appearance.

The heart of the Tyrrell's rear suspension is the oil-filled coil-over shock. It performed well and showed no sign of leaking.



Next, mount the Mabuchi stock 540 motor. It fits the rear pod a little tightly, so you must be careful to avoid damaging a power wire as you install it. The motor wires are rather short, and you might have to extend them.

Step 8-10 involves the rear damper assembly—the main rear suspension. The damper is oil-filled for smooth rear-end control. If this part breaks when you're racing, it will probably ruin your car's handling, and you'll probably run someone off the road, too! Your kit provides Tamiya silicone damper oil, but use it sparingly, because you only have a little extra. Expect to get some oil on your hands, and be sure to let all the air bubbles escape from the chamber. When you don't hear any more bubbles, you know your shock is ready for action.

By the time you're ready for the front suspension, you'll know there's nothing very difficult about assembling this car, but here's where you'll do the most hair pulling and teeth grinding! If you don't have any patience, you'd better develop some quickly. When assembling the upright joint, you have to measure precisely and make sure that the kingpin lines up correctly. Tighten

the grub screw onto the kingpin, and when, in step 13, you put your entire front suspension together, pay great attention to the location of the screws. When I reached the last step, I didn't have the right screws, and I had to take most of the car apart to find out where I'd put them! I don't want you to make the same mistake, so read carefully!

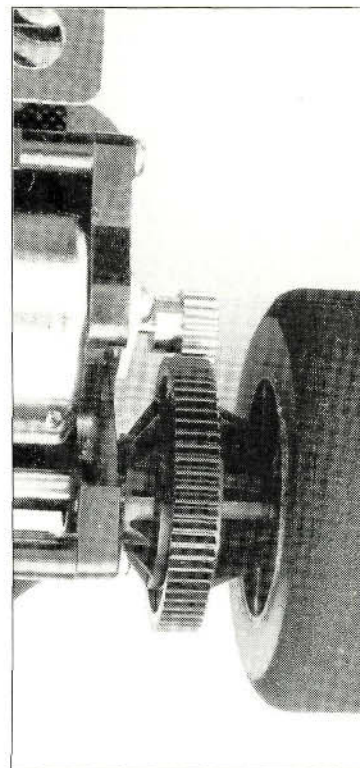
THE ELECTRONICS

The kit doesn't include a battery pack, a speed controller, or a radio, so Steve set me up with an MRC Top Gun radio, an SCI* Red Baron ESC and an EX racing pack. First, plug in the electronics and center the steering servo. Select the proper insert for your radio, and snap it into the servo saver.

The ESC barely reached the motor wires, so I moved it slightly backward and moved the receiver forward. After making one adjustment to one trim dial on the ESC, the throttle was set.

ADJUSTING THE TIE RODS

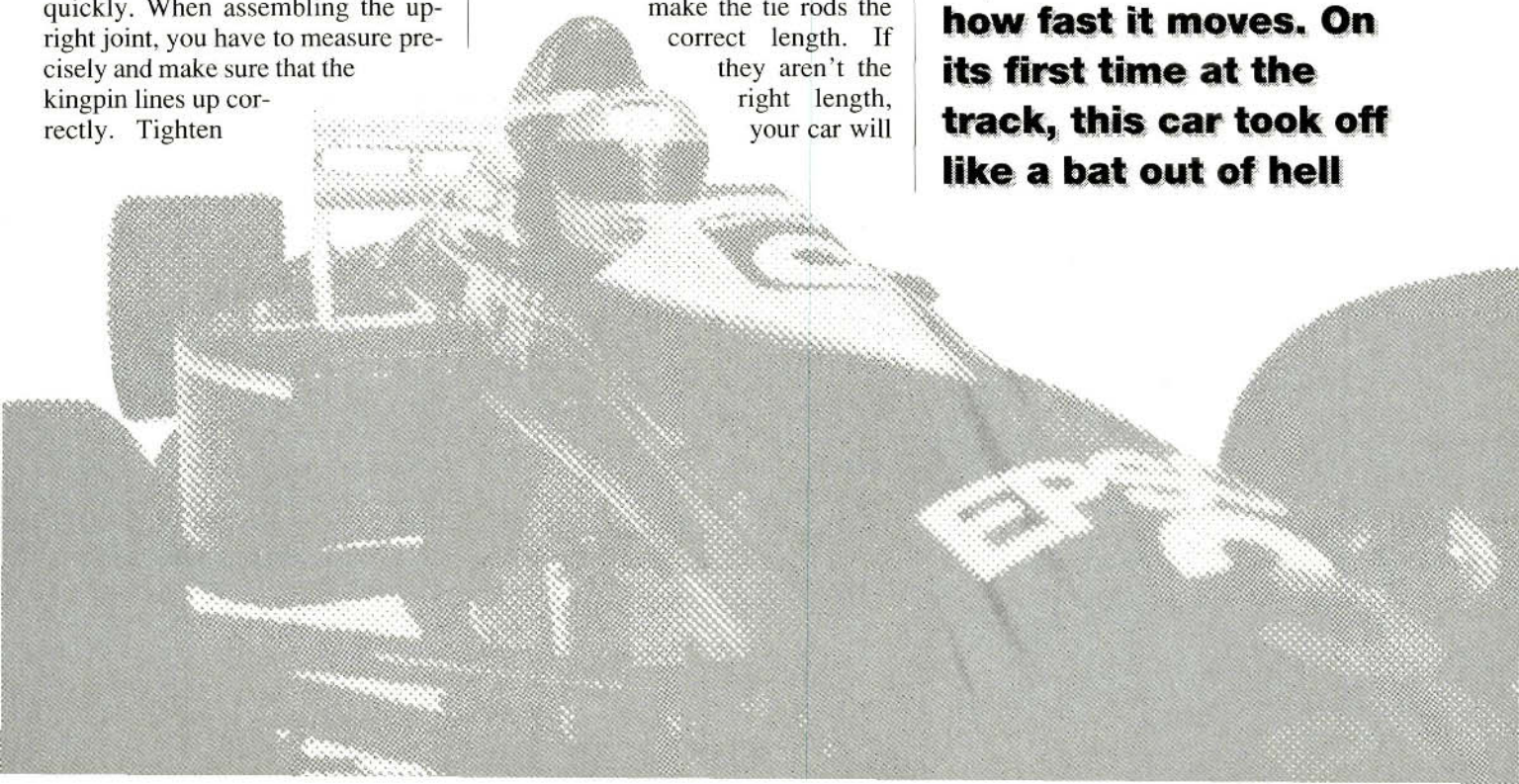
This step is a breeze: just be sure to make the tie rods the correct length. If they aren't the right length, your car will



Power is delivered to the rear wheels by means of an enclosed ball differential that can be adjusted by turning the nut on the end of the axle.

...you'll be amazed at how fast it moves. On its first time at the track, this car took off like a bat out of hell

TYRRELL
019 FORD



TYRRELL 019 FORD

Type On-road electric
Scale 1/10
Sug. Retail Price \$170

DIMENSIONS:
Overall Length 16.185 inches
Width 7.870 inches
Wheelbase 10.25 inches
Front Track 6.589 inches
Rear Track 6.112 inches

WEIGHT:
Gross (w/bat.) 3 pounds, 7 ounces

BODY:
Type Tyrrell 019
Material Polycarbonate

CHASSIS:
Type Pan
Material Fiberglass

DRIVE TRAIN:
Primary Gear
Transmission Direct-drive
Differential Ball
Bearings/Bushings Bronze and plastic bushings; ball bearings

SUSPENSION:
Front: Type Floating kingpin
Damping None
Rear: Type T-plate
Damping Oil-filled, coil-over shocks

WHEELS:
Front: Type One-piece plastic
Dimensions (DxW) 1.75x1.19 inches
Rear: Type One-piece plastic
Dimensions (DxW) 1.45x1.79 inches

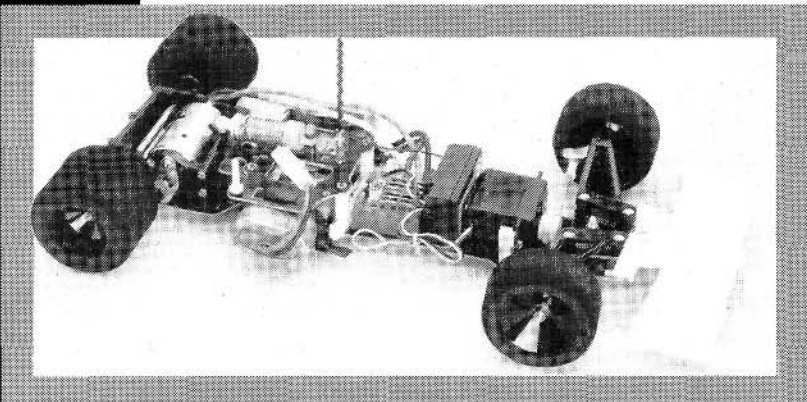
TIRES:
Front/Rear Foam

ELECTRICS:
Motor RS 540S
Battery 6-cell stick pack*
Speed Controller Not included

OPTIONS AS TESTED:
MRC Top Gun 2-channel radio; SCI Red Baron ESC with variable forward and reverse; Tamiya 6-cell EX 1700mAh battery pack.

COMMENTS:
This entry-level car was very easy to assemble. Its out-of-the-box handling was good, but a little looseness in the rear keeps you on your toes. Don't let your guard down—it has a 540S motor and, when up to speed, it's a little rocket! More for blasting down the driveway than the race-track, this car is awesome!

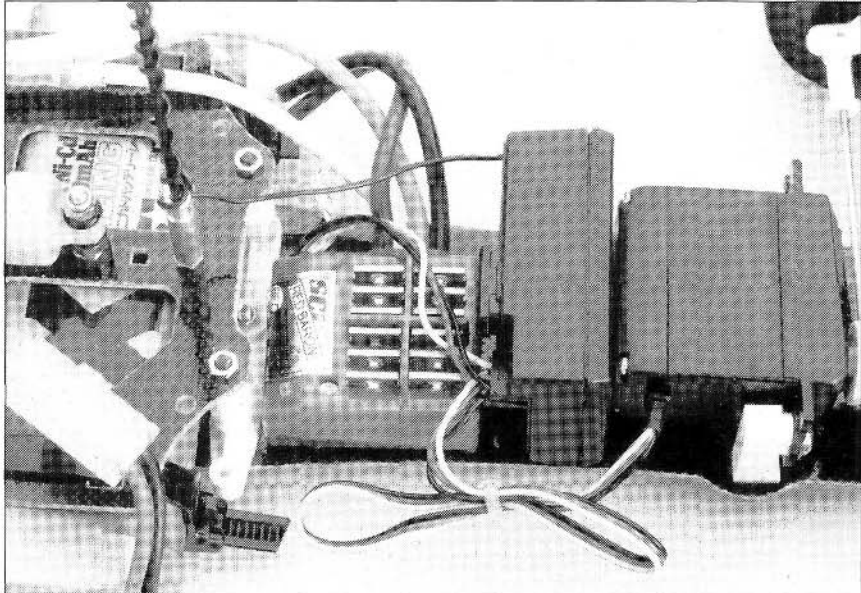
*not included



FORD FINISHING

I tried to paint the body as described in the instructions, but it was very difficult. The first time, the paint ran until the body looked like a block of melting ice cream. For my second attempt, I changed the color scheme a little—a red body and silver wings. Nice and easy.

probably wander and eventually take a sharp turn into a wall. (If this happened to your car, you'd simply repair it; but if this happened to me, Editor Pond would have my head on a plate.) Both wheels should be almost parallel, with just the slightest toe-in.



SCI's small Red Baron ESC fits easily onto the chassis. To make the wires reach the motor, the ESC was mounted behind the receiver. The Red Baron has a two-color LED that indicates forward and reverse.

ASSEMBLING THE REAR END

This car has a limited-slip rear end with an easy-to-build ball differential. (Be sure to apply grease to the appropriate areas of the differential.) The 17-tooth pinion gear is easy enough to put on, but be careful with alignment: you must position the setscrew on the motor shaft's flat spot exactly, or the gear will fall off while you're driving. Also, pay attention to the alignment of the pinion gear and the spur gear. Now you can mount the wheels.

To prepare the body, just wash it with warm water and dry it with a towel. Then mask it, cover the outside to protect it from overspray, and paint it in any way you want. The instructions show you how to duplicate the body shown, but I opted for something different. I recommend that you paint the body first and then do the cutting, because this will help you avoid the problem of overspray. After painting, apply the decals, but

(Continued on page 98)

TROUBLESHOOTING

by STEVE POND

Illustrations by JIM NEWMAN

If you have a technical problem that your hobby shop or racing friends can't resolve, give us a shout at Radio Control Car Action, and we'll see if we can chase down an answer for you. Questions should be of a technical nature and should be addressed to Troubleshooting, c/o Radio Control Car Action, 251 Danbury Rd., Wilton, CT 06897.



MOTOR MADNESS

Recently, I bought a Clod Buster, but I haven't run it because I'm building an 8x8 Super Clod (48x15x18 inches). It's designed to use four Clod Buster tranny units—three in the rear and one in the front.

Here's the problem: I have four Matched Madness motors and four Clod Buster motors; two are regular rotation, and two are reverse rotation (including four stock motors). Could I install three reverse-rotation motors on the rear tandem axles and a regular rotation in the front, or should I install two reverse and one regular on the tandem and one regular at the front? Which setup can I get away with, and which one gives the best performance?

I have four motors and four 6-cell, D-size, 4000mAh batteries, and I can't find a controller that can handle 24 cells and spread the power evenly among four motors—or should I buy two PDI Turbo Zeta ESCs?

Ron "Ramcharger" Chase
Englewood, CO

I won't go into the impracticalities of building an eight-wheel Clod Buster, but

there are a few things you need to know about motors and batteries.

First, the only thing that determines whether you use a regular or reverse-rotation motor is the direction in which the axle assemblies are installed. In the stock configuration, the reverse-rotation motor goes in the rear of the Clod, and the regular-rotation motor goes in the front. Motor rotation is determined by the position of the axle assemblies.

You can change the rotation of the Monster Mash motors by loosening the two endbell screws and rotating the endbell 180 degrees. To change the rotation of the stock sealed motors, simply switch the positive and negative leads.

You also have a misconception about how much power you'll need to get this thing moving. Your four, 6-cell, 4000mAh packs are more than enough. You seem to think that you need a battery pack to power each motor. A single pack that's properly connected to the SC(s) and to the motors will provide as much voltage and power for the four motors as it would to one motor. If you intend to hook the packs in series and generate 28.8 volts—well, let's just say you'll be making frequent trips to the hobby shop for new motors. As far as the SCs go, you might need two for the four motors, and the PDI unit you mentioned is an excellent choice. Use a Y-cord to connect the two SCs to the receiver.



HARD LANDINGS

I just bought a Kyosho Lazer, and I have a few problems. When the car is airborne

over a jump, its nose hits first and digs out a nice crater when it lands. I've tried moving the battery back as far as possible, and I've moved the spring collars as far down as possible. Do you have any suggestions?

I also have a problem with the differential. I've never used a car with a diff before (I used to have a Javelin). How do you know if it's adjusted properly?

Scott McNish
Fairborn, OH

The problem you're experiencing is common in all 4WD cars. The added weight of the front drive assembly can cause the front end to drop over a jump and land nose first. There are a few corrective measures that can be taken, but tightening the springs isn't one of them.

The problem with increasing spring tension is that you compromise the car's handling for the sake of clearing a few jumps. Dial-in the car so that it handles well through most of the track, and then work your way through the rough section. It's almost impossible for your car to handle well on the entire track. Also, increasing spring tension on the suspension will only raise the ride height and the center of gravity, and this only adds to handling problems.

The solution is to change your driving technique, not the suspension setup. When you approach a jump, let off the throttle momentarily to settle the suspension. As the car starts over a jump, give it full throttle. This will transfer the weight toward the rear of the car, and this will help to keep its nose up. Also, the torque of the wheels accelerating while the car is airborne will help to keep the nose high (Hitting the throttle while the car is in your hand demonstrates this well.) Be careful not to have the throttle pegged when the car hits the ground; it may accelerate wear on the drive train.

I prefer to run a diff tightly. To check the setting with the diff out of the car, slide two flathead screwdrivers into the drive cups to hold them steady, and try to rotate

(Continued on page 46)



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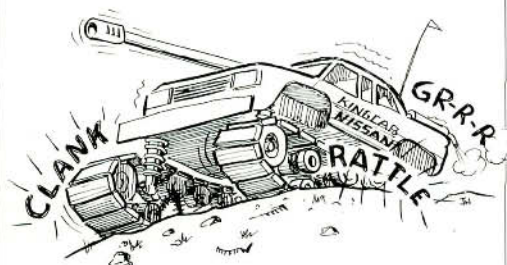
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TROUBLESHOOTING

(Continued from page 44)

the pulley or the gear. It should be difficult to move. To check the setting with the diffs in the car, hold the front end off the ground while pressing the rear tires to the ground; then apply the throttle. Tighten the diff until there's just a little slippage, and do the same for the front. Don't tighten the diffs beyond the point where they grab; over-tightening will dent the surface on which the balls ride.



SOUNDS LIKE A TANK

My dad bought me a Nissan King Cab, and he assembled it for me. He had never done this before, and there were a few things wrong with it: the shocks weren't assembled correctly, and the gearbox made a really funny noise. My friend and I fixed the shocks, but when we took the gearbox apart, we found nothing wrong. We replaced the old gears with new ones, but it didn't help. We left it like it was for about a month and made a few improvements to the rest of the truck. We installed a Novak T-1 speed controller and a Speedworks 427 motor. When we took the truck to our local track, we asked the hobby shop salesman to look at it. After he checked to see if the gears had meshed properly, he said he had no idea what the problem was.

I raced the truck anyway with fair results. There was another King Cab on the track, and it ran well. As the night went on, my problems increased: the noise got really loud, and people started making fun of my truck—including the race announcer. She said that it sounded like a tank (and it did). Please help!

William Trias
Long Beach, CA

The King Cab's transmission has a weak bracket. Mounted in the transmission is a shaft on which the counter gear runs. At one end, the shaft is supported by a 3mm screw, but on the other end, it's supported by a U-shaped plastic bracket. This bracket can develop a hairline fracture when excessive power is put through the transmission. The fracture is only evident when a great deal of stress is placed on the gears; otherwise it's very difficult to notice.

Under racing conditions, a fractured bracket flexes and pushes apart the counter gear and the smaller section of the spur gear, and this always causes the gears to strip. When you take the truck back to the pits, the damaged bracket returns to its original position, and you're left scratching your head as you try to figure out what's happening. To check for hairline fractures, remove the King Cab's stock bracket from the truck, and flex it by hand.

Stormer Racing offers a machined-aluminum bracket to replace the stock plastic unit. I've used Stormer's bracket on my own truck with excellent results, and I was running a 12-turn modified! This may be the solution to your problem.



THE STORE WAS CLOSED

I own a Tamiya Madcap. When I give it some throttle, the gearbox makes a loud grinding noise. When I removed the gearbox cover, the spur gear's teeth were worn out. My local hobby shop was closed, so I couldn't get another gear. I decided to put in my stock motor with a 70-tooth spur

(Continued on page 110)



CIRCA 1977

TIME WARP:

by JOHN HUBER

With technology advancing at a break-neck speed, it's important to look back at what we once thought was "state of the art"! This article looks at cars that are outdated and, possibly, almost forgotten, but they're worthy of review. If you have an older car that you think deserves a closer look, tell us about it.

Today, most R/C vehicles are off-road cars, but where did their popularity start? I traveled back to 1977 to check out Tamiya's first off-roader—the XR311. After all, sometimes you have to look back to see ahead.



WHEN I REALIZED it was time for another "Time Warp" investigation, I hadn't a clue where to look for a suitable subject. (The lady at the old hobby shop was out of old kits.) Then I heard from Eric Kircher. He had read my article about the B2B

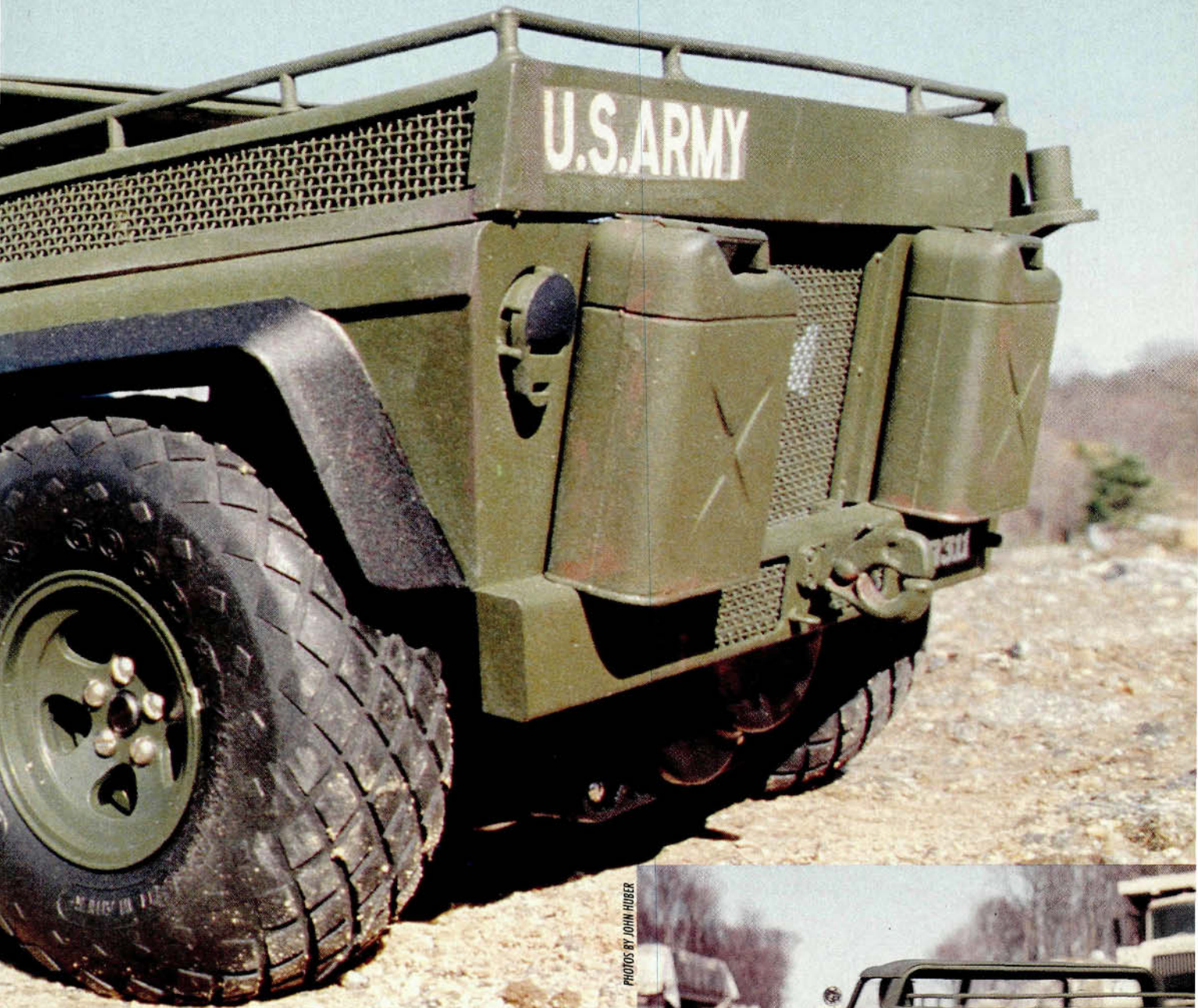
and wanted to let me know that he had Tamiya's* first off-road car—the XR311. I gave him a call; we agreed on a price; and the XR311 was on its way.

Eric had already assembled it, so there wasn't much for me to do, but I painted on some details that

OLIVE-DRAB CAB

XR311

T A M I Y A



PHOTOS BY JOHN HUBER

make it look more like the full-size version. I could tell this was an early R/C model because it says "Suitable for radio control" on its box. (It's sort of midway between a static model and an R/C model.)



TAMIYA FMC XR311

Type Off-road
Scale 1/12
Year Introduced 1977

DIMENSIONS:

Overall Length 15.5 inches
Width 6.75 inches
Wheelbase 10.2 inches
Front/Rear Track 5.5 inches

WEIGHT:

Gross (w/bat.) 3 pounds, 15.29 ounces

BODY

Type FMC XR311
Material Polystyrene

CHASSIS:

Type Tub
Material Aluminum

DRIVE TRAIN:

Primary Gear/pinion
Transmission Gear
Differential None
Bearings/Bushings Bronze bushings

SUSPENSION:

Front/Rear:
Type Upper and lower A-arms
w/torsion bars
Damping none

WHEELS:

Front/Rear: Type Three piece plastic
Dimensions (DxW) 1.35x.9

TIRES:

Front/Rear Semi-pneumatic,
diamond pattern

ELECTRICS:

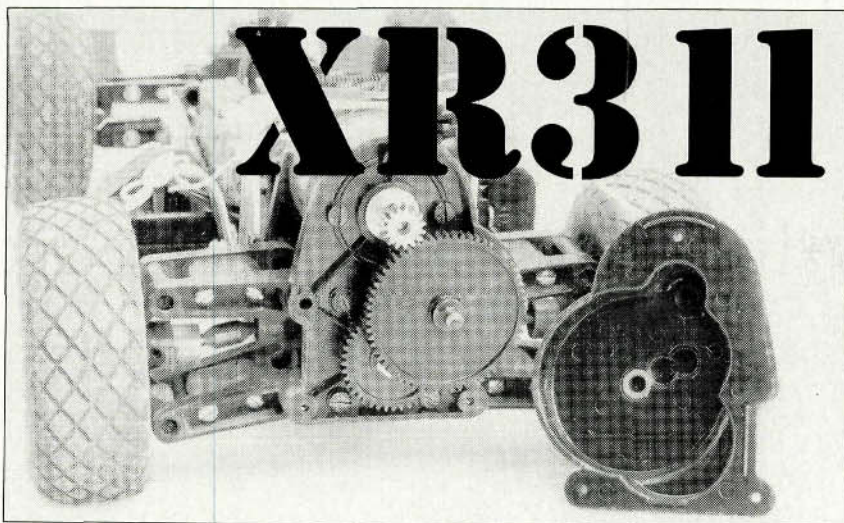
Motor 540
Battery 5-cell
Speed Controller 2-step
forward/reverse

OPTIONS AS TESTED:

Futaba Attack Sport radio with S148 servos, un-matched 5-cell pack, stock 540 motor with medium and slow gearing.

COMMENTS:

This kit was a blast to drive around: its sleek body and driver make it look so much like its full-scale counterpart. The absence of a differential was apparent when turning, but it still maneuvered well. The plastic torsion bars worked much better than expected, but without damping, the ride was bumpy. Though this model was Tamiya's first off-roader, it has many features that are still used.



Obtain a different gear ratio by swapping the large counter gear shown here for one of the two other gears provided. The counter-gear support bushings can be moved to accommodate other gears.

DA MACHINE

The XR311's chassis is made of an aluminum channel. The receiver and receiver battery pack are mounted on aluminum plates that hang on one side of the chassis. A 5-cell motor battery runs lengthwise along the chassis channel. Just behind the motor battery, I found the same, primitive, two-step speed controller as the B2B has. The motor itself is mounted above the rear gearbox—an odd place, but it has its benefits.

The XR311 comes with three gears, so you have a choice of three gear ratios; use the gear that gives the ratio you want. The gear rides on a shaft that's supported by two bushings: one in the gearbox case and one

in the gear cover. Each gear has three bushing locations that automatically set the proper gear mesh. No pinion changes; no fiddling with pinion wrenches.

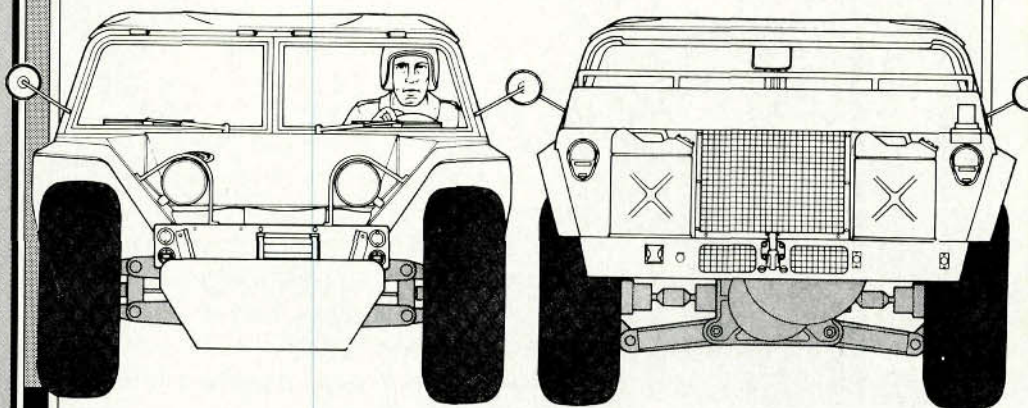
I was surprised to find 4W independent suspension on such an early R/C car. Each corner has an upper and lower A-arm and independent plastic torsion bars, which run along the bottom of the chassis and are protected by a plastic guard. These torsion bars are adjustable! On

the end of each bar, there are splines like the splines on a servo shaft. To increase or decrease tension on the A-arms, pull the splines out, twist them and re-insert them. Ingenious! But there's no damping system. Boo!

The gearbox consists of a center

(Continued on page 53)

To increase or decrease tension on the A-arms, pull the splines out, twist them and re-insert them. Ingenious!



FMC



HIGH-MOBILITY VEHICLE



PHOTO COURTESY FMC CORPORATION

'70s DUNE BUGGY

In early 1970, it looked as if the U.S. Army were preparing for an off-road race. At the Fort Knox tank-proving grounds near Louisville, KY, they were testing a new vehicle—the XR311 ("X" stood for "Experimental"). Known as the "Military Dune Buggy," the XR311 was being tested as a possible replacement for the good ol' Jeep.

Several features made the XR311 interesting, including its tubeless tires that had smaller, inflated, tires inside to act as spares for each wheel and en-

sure "get-home" capability. With its low silhouette and quiet engine, the versatile XR311 was rated highly by the government, but it never gained the recognition needed to take it into production.

Special kits were available to adapt the XR311 to specific military roles —convoy escort, security patrol, command and control, forward air defense communications, reconnaissance, medical evacuation, military police, mortar carrier and riot control. The XR311 shown here is equipped with an anti-tank missile launcher.

S P E C S

Personnel 2-5 (including driver)

WEIGHT

Net (incl. fuel) 4,700 pounds

Payload (incl. personnel) 2,500 pounds

Gross 7,200 pounds

ENGINE

Make and type Chrysler V8

Displacement 5.2 liters

Gross hp rating (2,200rpm) 187hp

Gross torque (@2,200rpm) ... 40 pounds/feet

Type of fuel Regular gasoline/
86-octane minimum

Valve arrangement Overhead

POWER TRAIN

Transmission Chrysler A-727,
automatic w/torque converter

Speeds three forward, one reverse

Differentials

Type Controlled slip, front and rear

Ratio 5.38:1

WHEELS

Material and type Steel,
semi-drop center

Tires, standard equipment

Number and type Nylon cord,
each with safety inner tire

Tread Non-directional, all-terrain

Size and ply 12.4x16, 6-ply rating

SUSPENSION

Type 4W, independent, double-
A arm design

Springs Torsion bar

Shock absorbers Hydraulic,
telescopic, two-way direct control

Roll control Rear stabilizer bar

STEERING

Type Split tie-rod with intermediate link

Steering gear Recirculating ball
worm gear with hydraulic assist

Frame Tubular, steel, roll-cage design

Brakes Hydro-boost hydraulic,
ventilated-disk-type on all wheels

PERFORMANCE

Maximum speed 80mph

Acceleration (0 to 60) 10 seconds

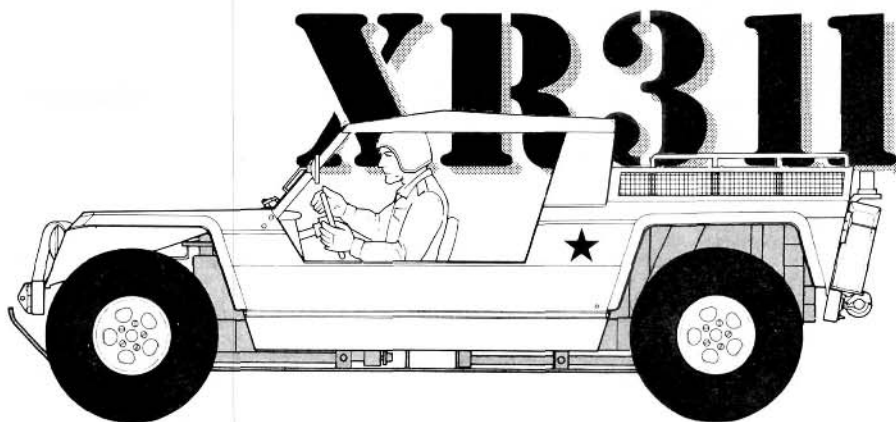
Range 300 miles

Turning radius 25 feet

Gradients capable of:

Up and down 60 degrees

Sideways 50 degrees



gear (no differential) that's driven by a bevel gear. What do ya know?—dogbones! Little brass dogbones, in fact. This thing wasn't as primitive as I had thought! Bronze bushings are included: most are the familiar 5x11mm size, but I think three are the 5x7mm ones—very strange.

The steering system is also interesting. A bellcrank connects the servo to the steering rods, and on the ends of each rod, there's a big loop. No Z-bends! The system does have a lot of slop, but it's nevertheless well-engineered. Some of the slop comes from the front bushings, which are mounted in the steering blocks (like those in the Corally car).

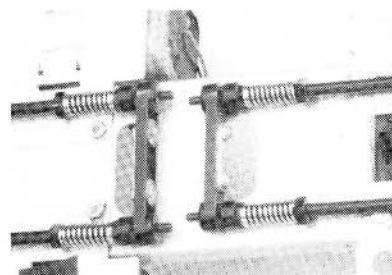
DA BODY

The detail on this body is like none I've ever seen. Not only does this car have windshield wipers and side mirrors, but it also has rivets, bolts, a tow hook, fuel cans, headlights, brush guards and screen engine vents, and its wheels and tires are exactly like those on the original. And that's just the outside! Inside, there's a driver, seats, a full dashboard with all the necessary gauges, a shift stick, brake and accelerator pedals, a fire extinguisher and a rear-view mirror. And this is just a *plastic* model! I painted the driver and "weathered" the outside by painting on some "rust" and "mud." The top is made of plastic, but it looks just

like canvas. Now it's time to test the motion...

TEST DRIVE

I installed the Futaba Attack sport radio from the B2B, and it was time to boogie. The first test drive took place in my living room. The absence of a diff was immediately apparent because the XR311's turning radius was quite large.



The XR311's unique torsion-bar suspension can be adjusted from the bottom of the chassis with a pair of pliers.

At a nearby park, I let it loose. Geared for medium speeds, it went slowly, and because it has no damping, it bounced a lot—over rough areas and smooth. It may sound like a bore to drive, but it looked real, and that actually made it fun! Later, I switched to even slower gearing to see how well it would climb. It crawled along on flat ground, but when it started to climb a 45-degree slope without slowing down, I was impressed.

Now I have another oldie in my collection of cars from yesteryear. I don't know exactly what you'll see here next time, but I'm working on it. ■

The completed XR311 is heavy and very solid.



HOME-BUILT PROJECT:



FLATBED CLOD

b y J O H N H U B E R

WHAT DO YOU need when your monster truck breaks down?—a monster flatbed, of course!—and that's exactly what Gary Tomsik, of Ingleside, IL, made. He combined one-and-a-half, ever-versatile Clod Busters to make the ultimate 6WD/6WS monster-truck flatbed.

Gary first had to come up with a chassis that would be long enough to take a flatbed. Rather than trying to join two Clod chassis, he decided to make his own. For this, he used some inexpensive, aluminum, angle stock, which

he found in 6-foot lengths at a local hardware store. Just right for a super-long chassis!

He made the chassis' two side rails out of angle stock, joining the pieces in the front with a shorter length. The rear ends of the side rails are joined by and bolted to a length of large threaded rod, which extends from the chassis to make the flatbed's rear mount. He bent sheet aluminum to form transmission mounts, which he riveted to the side rails. That's about it!—an inexpensive chassis!

Because the home-built flatbed was designed to be the

same width as the original chassis, the stock radio mounting plate fit right into it. The chassis has no bottom, so Gary made a battery-mounting tray out of some thin, aluminum gutter. The tray holds three standard stick packs, but they're wired in parallel, so the truck will operate with only one.

The vehicle uses three servos: one for throttle, one for front steering and one for rear steering. Gary operates the stock Mabuchi motors with a stock speed controller, and the setup works well. The steering servos are connected with

a Y-harness, so they operate off one channel. The two sets of rear wheels turn in the same way as those on a standard Clod. To turn right, the front wheels turn right and the front two *rear* wheels turn right, but the second two rear wheels turn left. This might sound complicated, but it's very effective. I drove the flatbed Clod during the photo shoot and was impressed with its turning ability.

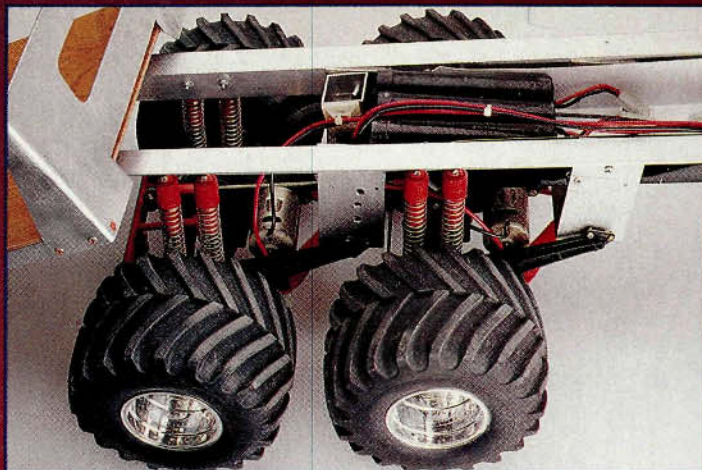
BED 'N' BOARD

The flatbed is made of a thin wooden board that was stained and varnished. Gary mounted the wood on U-shaped, aluminum channel-stock, and he bent more sheet stock to form the...well, I guess it's called a "head-board," since this is a flatbed.



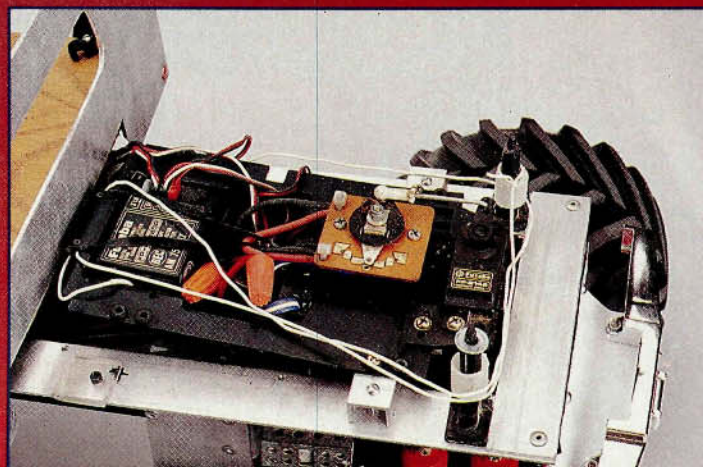
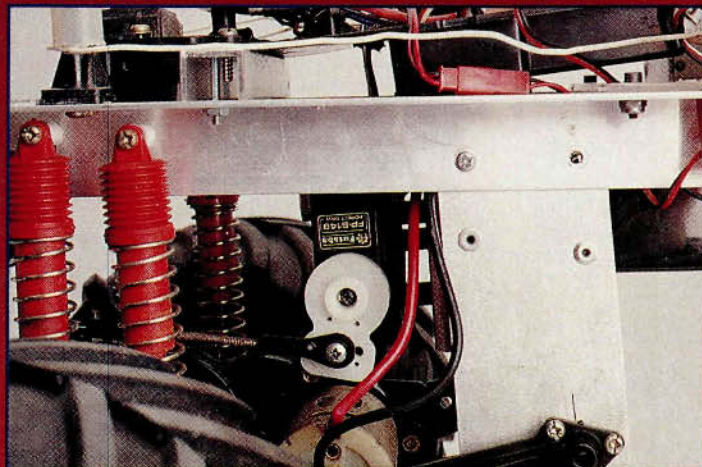
To mount the flatbed on the chassis, Gary simply turned it about 30 degrees so that the threaded rod at the rear of the chassis fit into the channel stock on the bed, then he stuck the front end to the Velcro® mounting pads that he had glued onto the chassis. Even with a payload, the bed stays on. The front of the stock Clod body was mounted on the stock body mounts.

Gary is now working on a new body and a lift kit for this project. It's great to see innovative R/Cers making vehicles with everyday parts instead of just relying on after-market stuff. Great job, Gary! I'm sure your Clod project will inspire other flatbed fanatics and truck terrors. Thank you for sharing it with us. ■

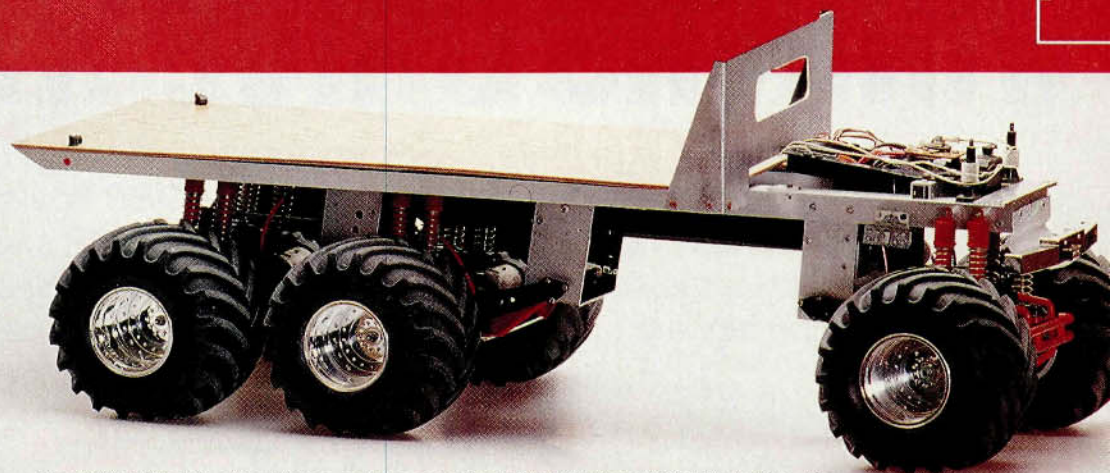


One Clod Buster is used for the rear of the flatbed. Notice how the tires' treads all point in the same direction.

The front wheels are steered by a single Futaba S148 servo. Rear steering is controlled by a servo that's connected to the same channel with a Y-harness.



The stock radio tray fits the new chassis perfectly. Use of the stock speed controller keeps down cost, and it can handle the power of the three stock motors.

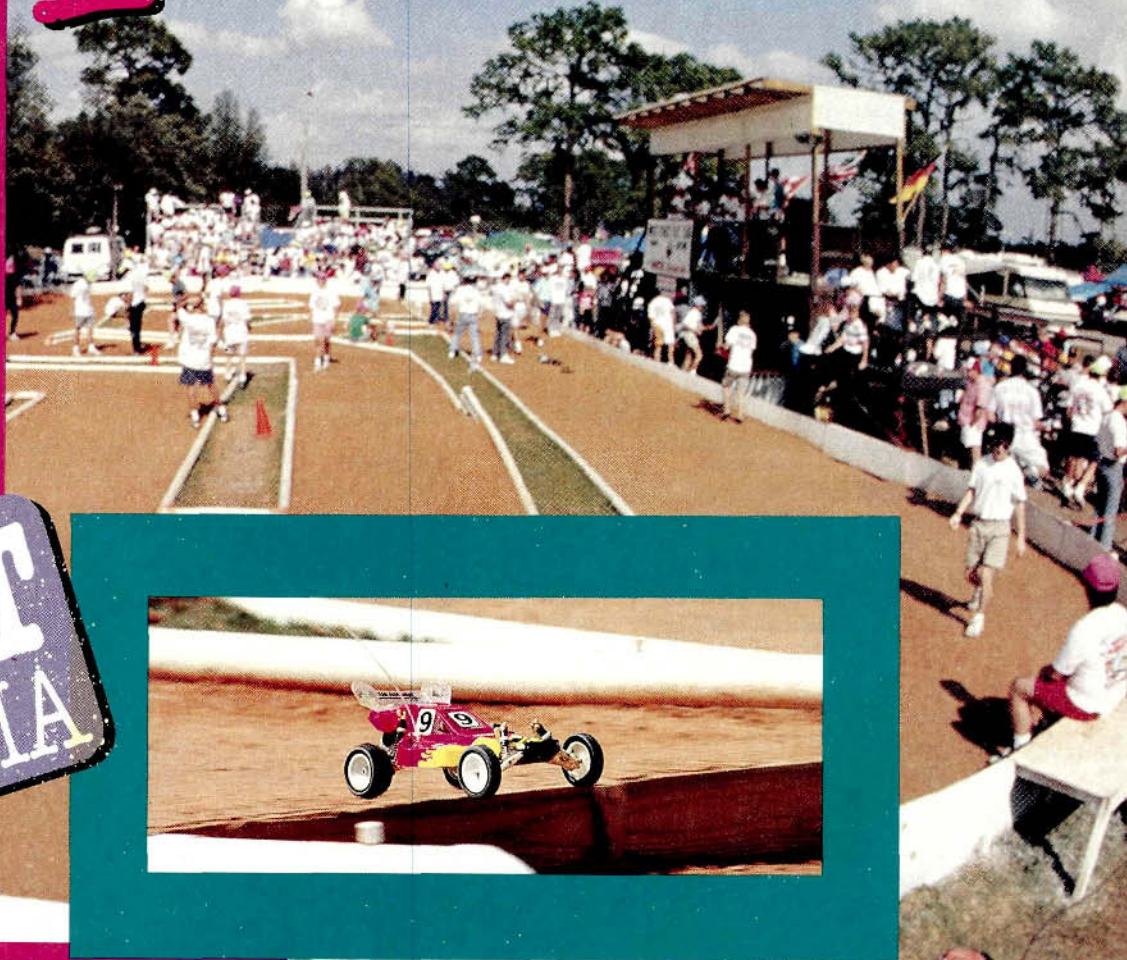


The Flatbed Clod is almost twice as long as a single Clod Buster. While it's turning, the two middle tires follow the fronts, but the rears are angled in a different direction.

monster mover



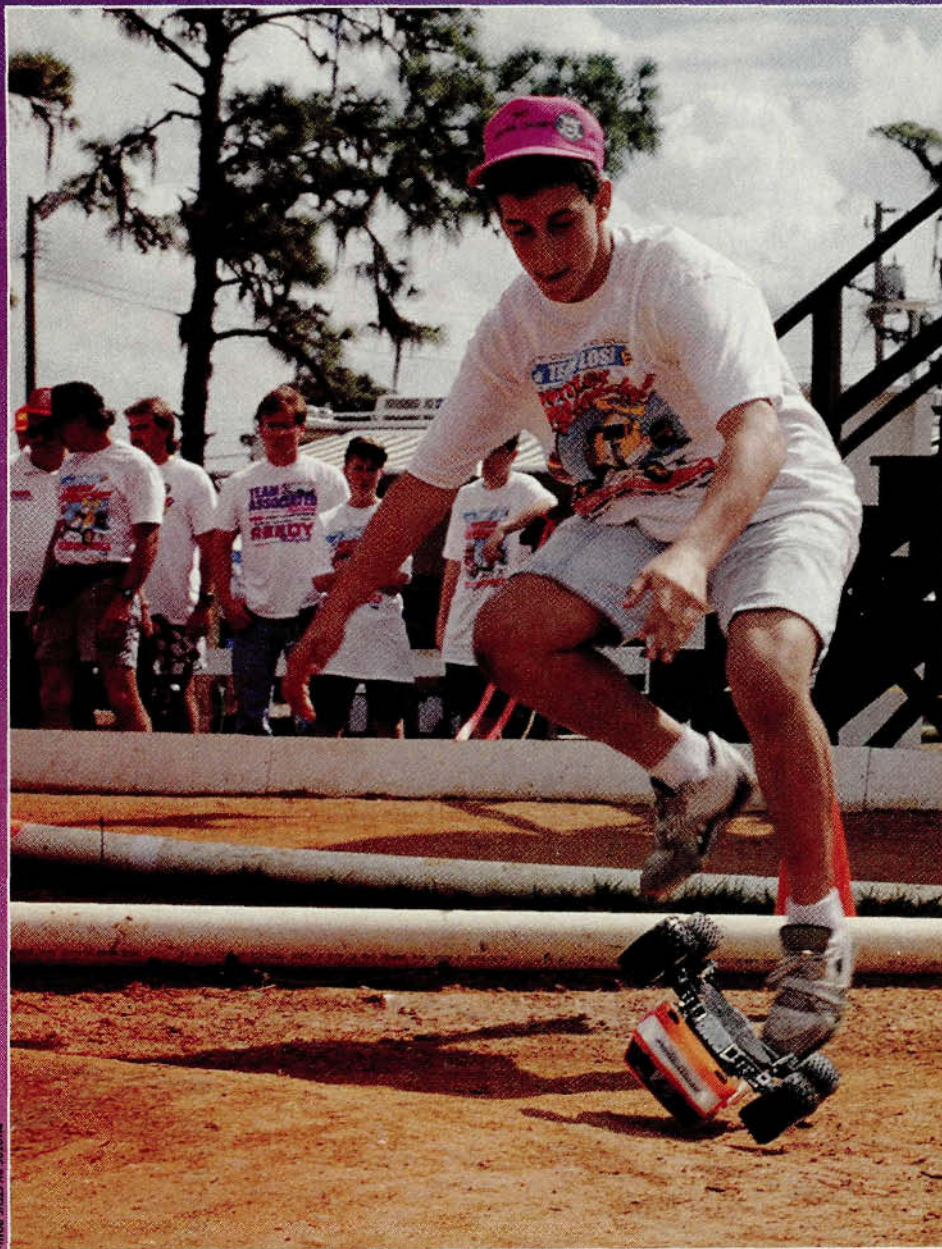
Florida



DIRT
DEMENTIA



WINTER CHAMPS



PHOTOS BY STEVE POND

by STEVE POND

WE'VE enjoyed the Florida Winter Champs for more than 15 years. At its inception, electric-powered R/C cars were nothing more than passing thoughts in the mind of an enterprising, engineering type who was looking for a different way of doing things. At that time, racers were burning up an asphalt track with 1/8-scale gas-powered cars. It wasn't until the electric-powered cars became popular that a class was created, and the rest, as they say, is history. The electric-powered off-road version of the Florida Winter Champs has become so popular that it's now outshining the gas-powered race.



Here's just one of the many superb cars that lined up for the Concours judging.

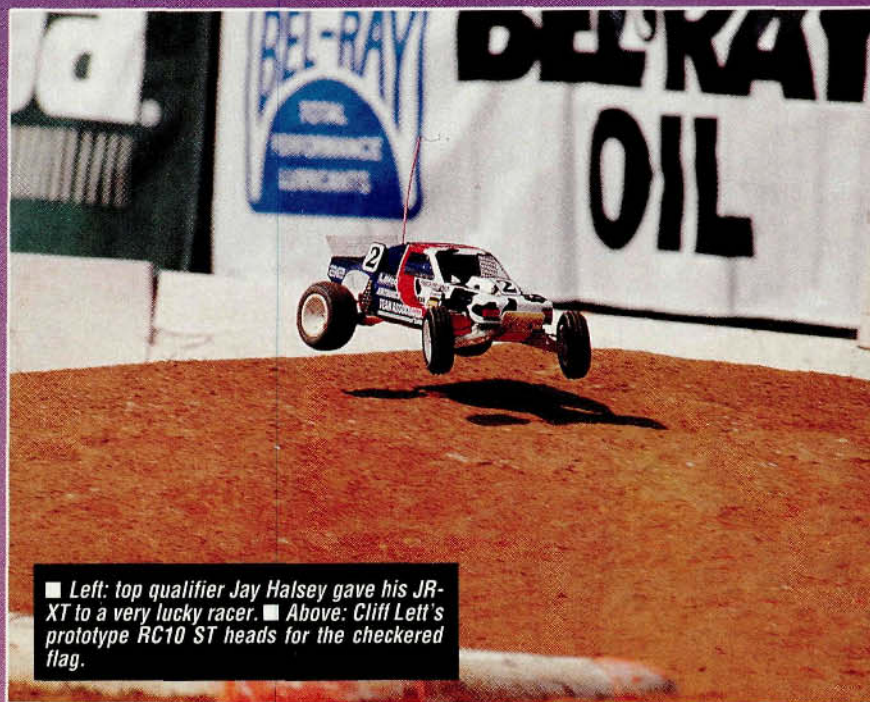
you do, damned if you don't. Despite the manufactured gripes, the event continues to cater to a capacity crowd, and this year was certainly no exception.

For the three-day event, four classes were available to drivers (2WD, 4WD and Racing

Like other select races around the country, the Winter Champs doesn't carry any kind of national title. It's appeal, however, has grown so tremendously that it's often attended by the biggest names in R/C off-road racing. It seems as though this has become the first big race of the season for most of the top drivers. It's a good chance for them to tune their skills for the racing season ahead and to test the wares the factories have been working on during the "off" season.

The race is so popular, in fact, that there's some controversy about sign-ups for it. It seems that far more racers wish to attend than there are spaces available. Every year, the Florida Winter Champs is host to a sold-out crowd, and those who're unable to make the roster have managed to stir the rumor pot about why they couldn't be part of the show. With the best of intentions, the club officials have been "testing the waters" year to year, as to how registration can be handled in an equitable fashion. This year, no pre-registration was allowed. Official entries were only accepted by mail. The entries were printed in a small R/C publication whose readers are concentrated in California. Those outside that area took longer to get their entries, and they think this allowed West Coast drivers an advantage. You know how the saying goes: damned if





■ Left: top qualifier Jay Halsey gave his JR-XT to a very lucky racer. ■ Above: Cliff Lett's prototype RC10 ST heads for the checkered flag.



TRUCKIN'

The biggest attention getter of the Winter Champs weekend was, without a doubt, the new Team As-

sociated racing truck. Devout Associated racing fans have been waiting for some time for the introduction of a factory racing truck, and now it seems their patience has paid off. The RC10 ST, as it's called, was introduced by Team Associated at the Winter Champs.

The RC10 ST is based on the aluminum-tub chassis used on many versions of the RC10 off-road racer. The front of the chassis has been narrowed slightly to accom-

modate the longer suspension arms designed specifically for the truck. A similar type of rear arm is also used. It looks as though the new Team shocks are used on the front and rear suspension, with the rear getting the longer version of the shock and the front using the shorter. The now famous Stealth transmission is also included, and it gives ultra-smooth power delivery.

A noticeable amount of rear toe-in is provided by



Truck, and 2WD Stock Class), but only two classes were allowed per entry. At 9:30 a.m. on Friday, the drivers' meeting kicked off the event; qualifying started 30 minutes later and continued through Saturday, and the main events were held on Sunday.

TOP TIRES?

The track's surface and configuration had been changed since the previous year, so those who had driven there in the past had no advantage. The new surface appeared to be a red clay. During the early qualifying rounds, the

IT'S A GAS, GAS, GAS!

An unusual product that *wasn't* raced at the Florida Winter Champs (but it certainly generated a lot of interest) was the gas-powered version of the Schumacher Shotgun racing truck.

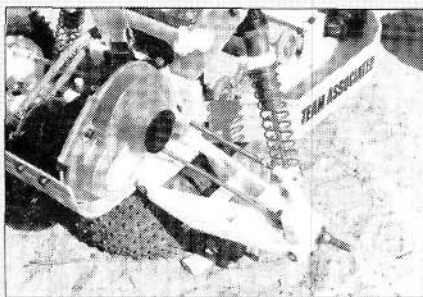
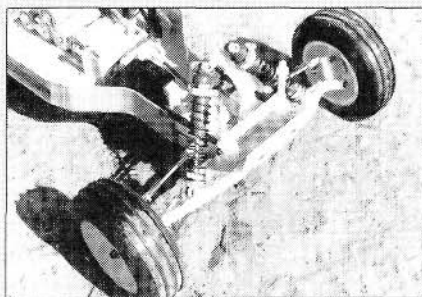
Like the Shotgun, this new, gas-powered, prototype truck is based on the design of the Cougar 2WD car. In fact, almost all of their suspension components are interchangeable. In the truck,



the electric hardware has been swapped for an Irvine .15 engine, and man, what a rush it is to see this thing go! To slow the truck a little, its carburetor's bore has been reduced from 8mm to 5mm. The "restrictor" prevents the engine from "maxing out" and increases its reliability. To be honest, this truck would be *too fast* without the 3mm bore.

Its starting gear is on board. A glow-plug battery is stored in the rear of the chassis with the radio power pack (there's no BEC with a gas-powered engine). To start the truck, simply flip a switch to light the glow plug, and tug the engine's recoil pull-starter once or twice. The truck's final selling price hasn't yet been decided, but it's bound to be expensive. But think how much you've spent on your electric-powered car!





The RC10 ST isn't just an RC10 with truck tires. Its longer suspension arms, new shock towers and narrow front end are just a few of its features.

new rear hub carriers. The toe angle is built into the carrier instead of the suspension-arm mount. This eliminates drastic changes in the wheelbase when adjusting the toe angle.

With all the new "trick" components of the truck, you'd think there would be more tech-related ques-

tions directed at the drivers, but surprisingly, most asked about the unique coating used on each of the chassis plates. It's a special powder that the manufacturer is thinking about offering as an option. The coating doesn't enhance the truck's performance in

any way; it just looks extremely "trick." It's available in fluorescent red, green and orange.

The RC10 ST managed to score a 1st and 2nd in its first time out, so it will obviously be the one to contend with when it hits the hobby shop shelves.

track had a respectable amount of bite, but as the event wore on, so did the track. The hot Florida sun took its toll, and the clay dried and became hard. This made tire selection more critical in the later rounds of qualifying.

The tires that seemed to be most effective for both the 2WD and 4WD cars (while there was still some loose dirt on the surface) included a new, directional-mini-spike. 2.2-inch Kyosho tire. Although the 2.2-inch rims aren't yet legal under ROAR rules, many drivers glued rubber bands to the bead of their rims to increase the diameters, then they glued the 2.2-inch tires over the rubber bands.

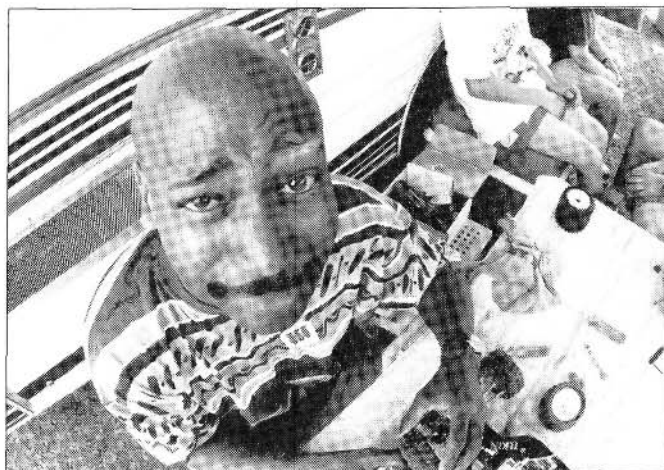
One of the more successful tires in the field was a new variety from Pro-Line that had been heavily tested before this race. They have an all-over mini-spike pattern, but were available in only limited quantities, in soft- and medium-compound rubber. During later qualifying rounds, when the loose dirt had been cleared away by the thousands of little tires that had streaked across it, the surface was ideal for off-road foam tires. You heard it right—foam tires! In Japan, drivers have been using foam tires on their off-road cars for tracks that are hard-packed and infrequently groomed.

A little moisture in the dirt is required for optimum traction with the foam tires. A couple of 5-minute showers and regular hosing by the track maintenance crew provided just enough of the wet stuff to make foams stick really well. Nobody had forecast that the track might be hard enough to use the foam tires, so few had them.

Another type of tire was also being tested at the Win-

spiked tires seemed to have the best traction, but when the sun came out and the track hardened, foam tires began to show up. After Saturday morning's brief rain showers, the Losi X-patterns and similar tires with a more aggressive tread seemed to dominate. This is when most, if not all, of the TQ runs in each class were turned in.

The notable drivers in the 2WD Stock Class qualifying were mostly local talents, but the star of the show was Californian Mike Tuntakit. Mike drove a Team Losi JR-X2 that eventually helped him grab the TQ spot for



MIP's designer/owner Eustace Moore—known for his ball diffs and creative 4WD RC10 conversions—is at home trackside and always willing to help.

the A-Main. Another hotshot was 9-year-old J.R. Mitch, whose Associated RC10 captured the seventh spot on the starting grid for the A-Main. A driver this young is usually seen as a hazard in a race of this caliber, but J.R. seemed to be naturally gifted. With more than 400 entrants, it's an understatement to say this kid is talented.

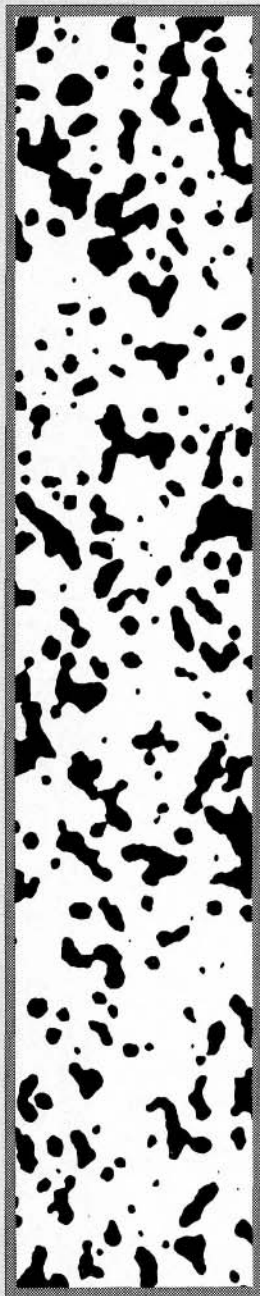
The Racing Truck Class was one of the most riveting

ter Champs for the Racing Truck Class. Team Associated showed up with a narrow front tire for their new RC10 ST racing truck. The theory behind the narrow tire is that it will allow quicker steering response because there's less rubber to swing to and fro.

QUALIFYING

The Friday and Saturday qualifying rounds tested the abilities of all the drivers—many of them exceptionally talented—as did the ever-changing weather. When there was cloud, the small pin-

WINTER CHAMPS



2WD MODIFIED

Fin	Qual	Name	Chassis	Motor	ESC	Charger	Batteries
1	4	J.D. Beckwith	Associated	Reedy	Novak 410 M1c	Turbo Charger	Reedy 1400 SCR
2	3	Mark Pavidis	Associated	Reedy	Novak 410 M1c	Novak	Reedy 1700 SCE
3	2	Rick Hohwart	Associated	Peak Perf.	Tekin 411P	Tekin	Team Orion 1400 SCR
4	1	Derek Furutani	Associated	Peak Perf.	Novak 410 M1c	Novak	Team Orion 1400 SCR
5	7	Kyle Reed	Losi	Revolution	Tekin 411P	Tekin	Prime Time 1400 SCR
6	10	Darrin Stump	Losi	Trinity	Tekin 411P	Tekin	Trinity 1400 SCR
7	9	Jack Johnson	Losi	Revolution	Tekin 411P	Victor	Prime Time 1700 SCE
8	6	Kris Moore	Kyosho	Twister	Novak 410 M1c	Novak	Twister 1700 SCE
9	8	Jay Halsey	Losi	Revolution	Tekin 411P	Tekin	Prime Time 1700 SCE
10	5	Kevin Moore	Schumacher	LRP	Nosram	Schumacher	Schumacher 1700 SCE

4WD MODIFIED

Fin	Qual	Name	Chassis	Motor	ESC	Charger	Batteries
1	5	Steve Dunn	Race Prep	Race Prep	Novak 410 MXc	Novak	Race Prep 1700 SCE
2	8	Brent Wallace	Schumacher	Twister	Tekin 420F	Tekin	Leading Edge 1700 SCE
3	1	Rick Hohwart	Kyosho	Perk Perf.	Tekin 420F	Tekin	Team Orion 1400 SCR
4	7	Gil Losi Jr.	Kyosho	Revolution	Novak 410 MXc	Novak	Prime Time 1700 SCE
5	2	Jon Morgan	Schumacher	Reedy	Tekin 411P	Tekin	Reedy 1400 SCR
6	9	Kris Moore	Kyosho	Twister	Novak 410 MXc	Novak	Twister 1700 SCE
7	4	Derek Furutani	Schumacher	Peak Perf.	Novak 410 MXc	Novak	Team Orion 1400 SCR
8	6	Jon Anderson	Kyosho	Revolution	Tekin 420F	Tekin	Prime Time 1400 SCR
9	3	Matt Ledger	Yokomo	Revtech	Tekin 411P	Turbo Charger	Sanyo 1700 SCE
10	10	Darrin Stump	Kyosho	Trinity	Tekin 420F	Tekin	Trinity 1700 SCE

2WD STOCK

Fin	Qual	Name	Chassis	Motor	ESC	Charger	Batteries
1	1	Mike Tuntakit	Losi		Novak 410 M1c	Tekin	Prime Time 1400 SCR
2	4	Greg Williams	Losi	H	Tekin 600	Tekin	Sanyo 1200 SCR
3	3	Joe Kolp	Losi	A	Tekin 700	Tekin	Team Arlington 1200 SCR
4	2	Tracey Todd	Schumacher	N	Novak 410 M1c	Navcom	A&D 1400 SCR
5	7	J.R. Mitch	Associated	D	Tekin 600	Tekin	ERP 1400 SCR
6	5	Jim Brown	Losi		Novak 410 M1c	Tekin	PTI 1400 SCR
7	9	Scott Mount	Losi	O	Tekin 411P	Tekin	PTI 1200 SCR
8	10	Chris Wilbanks	Associated	U	Tekin 411P	Astro Flight	Team Smooth 1200 SCR
9	6	John Mistic	Associated	T	Tekin 700	Tekin	ERP 1400 SCR
10	8	Doug Fichuk	Schumacher		Tekin 411P	Pak-Man	Schumacher 1400 SCR

2WD TRUCK

Fin	Qual	Name	Chassis	Motor	ESC	Charger	Batteries
1	3	Cliff Lett	Associated	Reedy	Novak 410	Novak	Reedy 1400 SCR
2	9	Butch Kloeber	Associated	Reedy	Tekin 420F	Schumacher	Reedy 1400 SCR
3	4	Bryan Peterson	A&L	Twister	Tekin 411	Tekin	Shogun 1700 SCE
4	1	Jay Halsey	Losi	Revolution	Tekin 420F	Victor	Prime Time 1400 SCR
5	5	Kyle Reed	Losi	Revolution	Tekin 420F	Tekin	Prime Time 1400 SCR
6	8	Mike Meighen	Traxxas	Magnum	Tekin 700	Benson	Atomic 1700 SCE
7	7	Mike Dunn	Losi	Race Prep	Novak 410 MXc	Novak	Race Prep 1700 SCE
8	10	Gary Kyes	Losi	Revolution	Novak 410 M1c	Victor	Prime Time 1400 SCR
9	6	J.R. Mitch	Traxxas	Magnum	Tekin 411P	Tekin	Lakeside 1400 SCR
10	2	Jack Johnson	Losi	Revolution	Tekin 411P	Victor	Prime Time 1700 SCE

for spectators, and fans of Associated and Team Losi cheered on their favorite vehicles. Jay Halsey and Jack Johnson of Team Losi grabbed the 1st and 2nd spots with their Revolution-powered JR-XTs for the A-Main start. Cliff Lett was the highest qualifier driving a Reedy-powered Associated RC10 ST truck. The seldom-heard name of Bryan Peterson was in the 4th qualifying spot with a Twister-powered A&L modified truck. In the 6th spot was the nimble-fingered J.R. Mitch. Now he was among the biggest names in R/C racing (an accomplishment many of us "older" racers still strive for)—at nine years old! Driving a Magnum-powered Traxxas Blue Eagle, J.R. out-qualified driving greats like Butch Kloeber, Gary Kyes and Mike Dunn!

4WD CLASS

The 4WD Class produced some of the most heated

competition seen in a while, but there was a stand-alone at the head of the qualifying results. Rick Hohwart, who is on a big-time winning streak, set the track on fire with his Peak Performance-powered Kyosho Lazer. Rick was having a one-man party, breaking his own newly established track records with almost every run. The Peak Performance-powered Schumacher Pro Cat of Derek Furutani sailed into the A-Main when he mounted a set of foam tires for the final round. Steve Dunn of Race Prep piloted his Pro Radiant to a 5th-place qualifying spot, but it was evident he was capable of more. Steve's Radiant was powered by a Race Prep motor and stuck to the ground with Team Losi tires, which were molded of a rubber compound he jokingly referred to as "good." The Reedy-powered Schumacher Cat driven by Jonathan Morgan slid into 2nd while Matt Ledger of Buffalo Grove, IL, came in right behind in

Radio	Body	Tires (f/r)	Sponsors
Airtronics	RCPS	Losi/Pro-Line	Reedy, Associated, Airtronics, Novak, Competition Electronics, RCPS
Airtronics	RCPS	Losi/Pro-Line	Reedy, Associated, Novak, Airtronics, RCPS
Futaba	RCPS	Losi (f/r)	Peak Performance, Associated, Futaba, Tekin, Team Orion
Airtronics	RCPS	Losi/Pro-Line	Peak Performance, Associated, Novak, Airtronics, RCPS
Airtronics	Losi	Losi (f/r)	Team Losi, Airtronics, Tekin, Jammin' Products
Airtronics	Losi	Losi (f/r)	Trinity, Team Losi, Kyosho
Airtronics	Losi	Losi (f/r)	Team Losi, Airtronics, Victor, Revolution Motors, Jammin' Products, Tekin
KO Propo	Kyosho	Losi (f/r)	Twister, Kyosho, Novak, Robinson Racing
Airtronics	Jammin' Jay's	Losi (f/r)	Team Losi, Airtronics, Victor, Turbo Matcher, Revolution Motors
KO Propo	Schumacher	Schumacher (f/r)	Schumacher, LRP, Nosram

Radio	Body	Tires (f/r)	Sponsors
Airtronics	Race Prep	Losi (f/r)	Race Prep, Novak, Airtronics, Team Losi
Futaba	Schumacher	Losi (f/r)	Schumacher, Twister, Tekin, Futaba, Leading Edge
Futaba	Kyosho	Losi (f/r)	Peak Performance, Kyosho, Futaba, Tekin, Team Orion
Airtronics	Kyosho	Losi (f/r)	Team Losi, Prime Time, Revolution, Kyosho
Airtronics	Schumacher	Schumacher/Losi	Associated, Reedy, Schumacher
KO Propo	Kyosho	Losi (f/r)	Twister, Kyosho, Novak, Robinson Racing
Airtronics	Schumacher	Losi (f/r)	Peak Performance, Schumacher, Novak, Airtronics
Airtronics	Kyosho	Losi (f/r)	Team Losi, Tekin, Airtronics
KO Propo	Yokomo	Losi (f/r)	Revtch, Team R&R, Tecnacraft
Airtronics	Kyosho	Losi (f/r)	Trinity, Kyosho, Losi

Radio	Body	Tires (f/r)	Sponsors
Airtronics	Losi	Losi (f/r)	Team Losi, Prime Time, Twister, Novak
Airtronics	Losi	Losi (f/r)	Team Losi, Trinity
KO Propo	Losi	Losi (f/r)	Twister, RPM, R/C World of Indiana, Custom Scale Components
Airtronics	Schumacher	Pro-Line/Losi	Schumacher, Hobbyland
Futaba	Jammin' Jay's	Traxxas/Losi	Lakeside Hobby, ERP
Airtronics	Losi	Losi (f/r)	Loupe's R/C of Baton Rouge
Airtronics	Losi	Losi (f/r)	
Futaba	Associated	Losi (f/r)	
Futaba	Associated	Losi (f/r)	ERP
Airtronics	Schumacher	Losi/Schumacher	Schumacher, Litespeed

Radio	Body	Tires (f/r)	Sponsors
Airtronics	Associated	Pro-Line (f/r)	Associated, Reedy, Novak, Airtronics, Oakley, RCPS, Gene's Burlesque Theater
Airtronics	Associated	Pro-Line (f/r)	Associated, Reedy, Airtronics, RCPS, Jammin' Jay's, Pro-Line
KO Propo	Pro-Line	Pro-Line (f/r)	A&L, Pro-Line, Twister
Airtronics	Losi	Losi (f/r)	Team Losi, Airtronics, Victor, Turbo Matcher, Revolution Motors
Airtronics	Losi	Losi (f/r)	Team Losi, Airtronics, Tekin, Jammin' Jay's
Airtronics	Traxxas	Losi (f/r)	Traxxas, Tightwad Hobbies, Magnum Motors, ERP
KO Propo	Losi	Losi (f/r)	Race Prep, Team Losi, Novak, KO Propo
Airtronics	Losi	Losi (f/r)	Losi, Novak, Airtronics, Jammin' Jay's, Skull Racing
Futaba	Pro-Line	Losi/Kyosho	Traxxas, Lakeside Hobby
Airtronics	Losi	Losi (f/r)	Team Losi, Airtronics, Victor, Revolution, Jammin' Jay's, Tekin

4th with his Revtech-powered Yokomo YZ-10.

2WD Modified was almost a repeat of the 4WD qualifying as Rick Hohwart set the pace from the first heat with his Peak Performance-powered Associated RC10. It turned out that Hohwart was bumped from his TQ spot by teammate Derek Furutani with a similarly equipped RC10. Mark Pavidis took the third spot on the grid with an RC10 for an Associated 1-2-3 qualifying sweep of the class.

SUPER SUNDAY

Getting the program rolling on Sunday was an early morning Concours that included some of the wildest lookin' Lexan ever! Michelle Hartman was the eventual winner with a dynamite-looking JR-X2 dressed in a "Coke" paint scheme.

Typically, large events start the final racing program with the lower Mains and work their way up to the A-Mains. The Winter Champs, however, started with the A-Mains in the 2WD and 4WD Modified Classes because there were three A-Mains for these classes.

The 4WD Class produced some of the most heated competition seen in a while!

Drivers in these Mains raced three heats and had their results averaged for a final result.

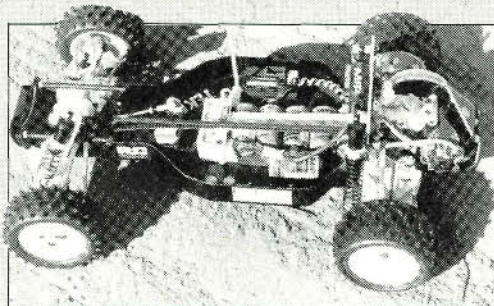
This format takes some of the excitement out of the final because the winner is determined after the fact. From a racing standpoint, though, it requires a consistent performance rather than a single lucky break.

The first of three A-Mains in the 2WD and 4WD

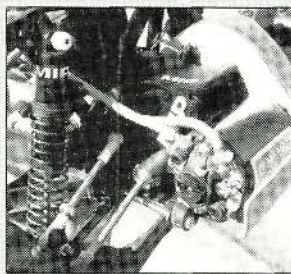
PARTS IS PARTS

Part of the appeal of attending a big race is that you get to check out the factory teams' latest products. Here are some of the products that I saw at the Florida Winter Champs. Keep in mind that some of them are still being developed, so the final versions might be somewhat different. Here's a sneak peek!

• **TRAXXAS** introduced a car that's based on the new Blue Eagle truck. The prototype had a plate-graphite chassis, but I'm told that the production car will have a molded-graphite or composite chassis. A new steering linkage replaces the direct linkage that was used on the early version of the truck, and the car's bellcrank setup should eliminate bump-steer. Its transmission is identical to that of the Blue Eagle truck, which has a three-gear design for improved acceleration and consistency.

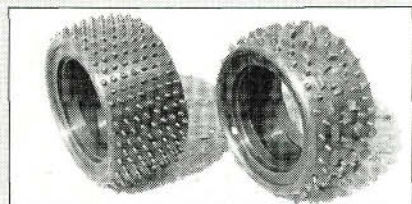


• **MIP** revealed two new products. The first is a JR-X2 transmission with a differential that's similar to that of MIP's RC10 transmission. This tranny's housing is attached directly to the stock bulkhead, which should make installation a snap. MIP has



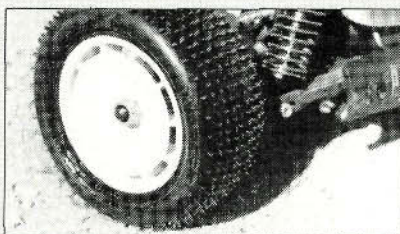
also updated its 4WD conversion kit for use with the Stealth transmission. It has been reported that modifications were made to the front differential and the housing to improve their durability.

• **TEAM PIT STOP** drivers tested a new racing truck, which is reported to be a kit—not part of the Nova line. The company also introduced a complete line of motors for all types of R/C racing.



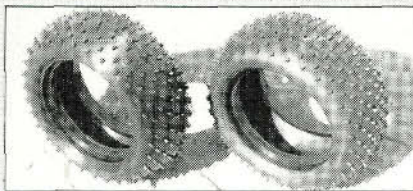
• **JAMMIN' JAY'S**—Team Losi will offer two new tires through its Jammin' Jay's product line. One has a very dense pin-spiked tread pattern, and the other has a variety of block-shaped and pin-style treads. They both have an X-pattern "cushion carcass" sidewall and they'll probably work well on medium- and high-bite surfaces. Only time (track time, that is!) will tell.

• **TEAM LOSI** drivers tested a new X-pattern tire with a different outer-spike pattern. All the Losi team cars also had prototype front suspension arms, which are designed to improve a car's turning ability on low-traction surfaces.



• **KYOSHO** let the top drivers test its new 2.2-inch line of tires. Now available in the U.S., the tires come with mini- and medium-directional block patterns, as well as H-block/pin-spike patterns. Two compounds should make it easy to get your car stuck to the ground. A number of 4WD Lazer performance accessories were also tested at the race, and a prototype of the new 2WD car competed.

• **SCHUMACHER** had more new items than I can list here, but the highlights include a new gas-powered car and off-road truck; new tire treads made of traditional compounds and an undisclosed, softer compound; and a new line of electronic testing and charging equipment.



• **PRO-LINE** had some new tires, too, and they seemed to be the most effective on the hard-packed Florida clay! Designed for all corners of 4WD cars and the rear of 2WD cars, the tires' unique, soft-compound rubber is molded into a mini-spike pattern for traction on slippery surfaces.

Classes started off the morning and continued throughout the day, with the final A-Mains closing out the event.

The early running of the A-Mains gave the competitors of the lower Mains a helping hand because they could see what tires the fast guys were using. This took some of the guesswork out of getting the cars hooked-up, but the ever-changing track conditions had to be taken into account before setting any car down on the grid. Many of the racers left the tires off their cars and patiently waited until it was close to the running of their heats until they chose a tire combination that they thought would work best.

The eventual winners of the event included top qualifier Mike Tuntakit in the 2WD Stock Class, Cliff Lett in the Truck Class, J.D. Beckwith in the 2WD Modified Class and Steve Dunn in the 4WD Class. Unfortunately, space doesn't allow me to note the accomplishments of all the drivers, but each must be given credit for doing his or her best, and for being part of a 15-year-old tradition that's going stronger than ever. Credit must also be given to the club's officials and race crew who were up to the task of managing more than 400 racers without even a minor glitch. ■

corally

FROM THE LAND of wooden shoes and windmills comes one of the most technically advanced, versatile on-road cars on the market. Based on the design of its younger brother, the World Champion SP-12, Corally's* new 1/10-scale SP-10 has many of the same award-winning features.

THE KIT

Although the SP-10 comes assembled, I took it apart to learn about its finer points. First, I noticed that its chassis is made of metal rather than of composite.

According to the manual, the hardened metal is

called "Coral," and it's very rigid. Coral eliminates the unwanted "tweak" that can occur with layered-composite

chassis, which flex at different points because of how they're

unique damping system and differential setup. In place of a



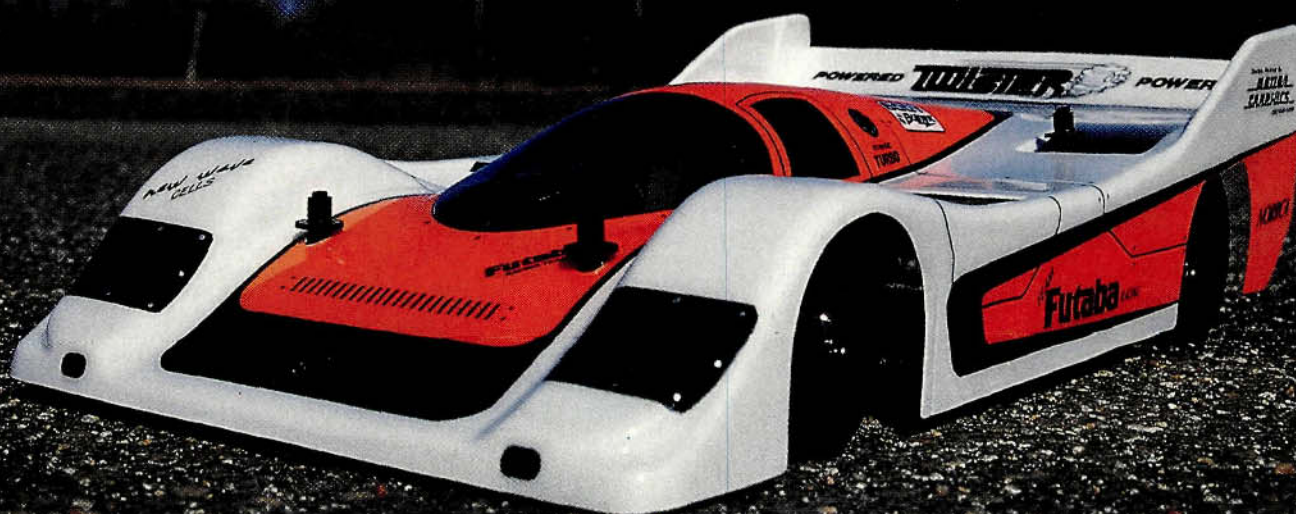
European speed demon!

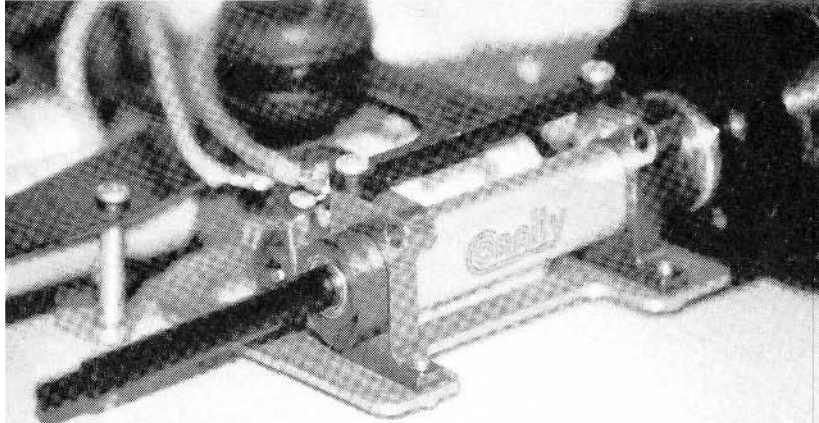
made.

Although the car's rear end is based on the popular T-plate design, Corally uses a

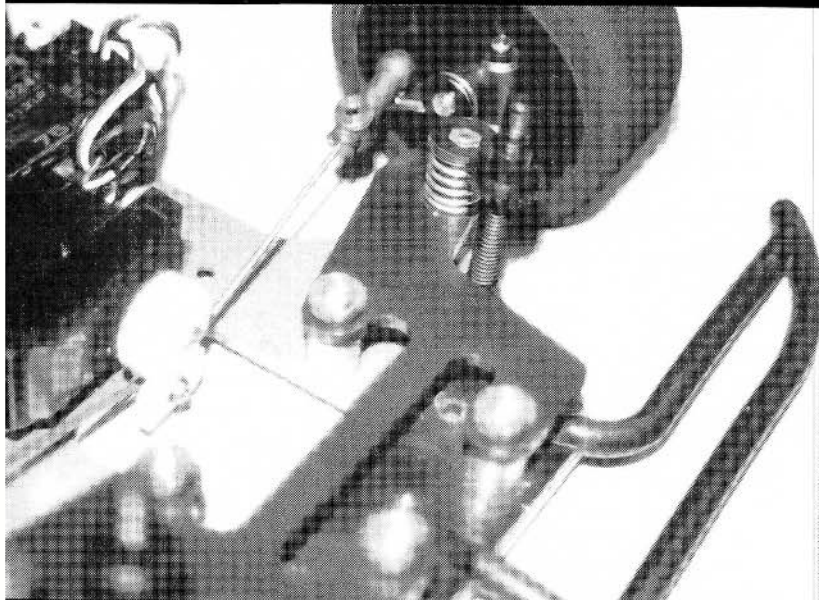
shock absorber, an upper damper-plate/post assembly floats freely inside an enclosed rubber boot that's filled

by JIM SHEPKA





This unique graphite axle allows you to install the rear tires by removing a small plastic C-ring. Unlike conventional axles, which only support the inside of the wheels, these extra-long axles also support the outsides.



To reduce bump-steer, the servo-saver is pointed downward rather than upward.

with a thick lubricant. This feature provides the rear pod with very consistent damping.

Between the front-beam suspension and the chassis, there are spacers of different sizes that are used to adjust camber/caster and ride height. Unlike a traditional steering-block/axle assembly in which the tire and bearings rotate around the axle, the SP-10's axle and tire rotate as a unit on bearings that are inside the steering block. Larger bearings support the entire assembly, and they spin more freely than standard-size bearings.

The chassis plate's

shape allows a choice of three locations for a split battery pack, and this enables you to alter the car's weight bias for different tracks. For roadcourses, you can mount three batteries on the left and three on the right; for oval racing, three on the left and three in the middle. The SP-10 also has a unique battery tie-down system. The cells are glued to a special adapter, which is then bolted to the chassis. This reportedly reduces the strain on the chassis and makes it easier to change the batteries.

This car's precision differential really intrigued

SPECIFICATIONS

Type On-road
Scale 1/10
Sug. Retail Price \$325

DIMENSIONS:

Overall Length 13.5 inches
Width 8.3 inches
Wheelbase 10.25 inches
Front Track 8.25 inches
Rear Track 8.3 inches

WEIGHT:

Gross (with battery) ... 43 ounces

BODY:

Type Not included

CHASSIS:

Type Flat pan
Material Coral (metal)

DRIVE TRAIN:

Primary Spur/pinion
Transmission Direct-drive
Differential Ball
Bearings/Bushings . Ball bearings

SUSPENSION:

Front: Type Cross-member A-arm
Damping Coil spring
Rear: Type T-plate
Damping Free-floating,
lubricant-filled damper

WHEELS:

Front: Type One-piece plastic
Dimensions (DxW)
1.8x1.25 inches
Rear: Type Two-piece plastic
(drive cone)
Dimensions (DxW)
1.8x1.25 inches

TIRES:

Front Blue dot foam
Rear Green-dot foam

ELECTRICS:

Motor Not included
Battery Not included
Speed Controller Not included

OPTIONS AS TESTED:

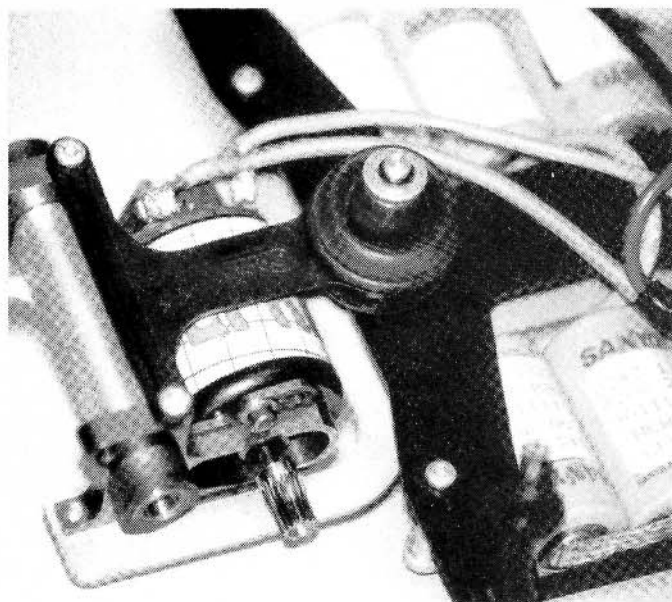
Futaba 3PB PCM;
Twister Blueprint 12-turn double motor;
Du-Mor spur and pinion gears; New Wave 6-cell 340 SCE battery pack; Pro-Line front bumper; SCAT tire compound and diff lube; NOSRAM DNS speed controller; Bolink Porsche 962 Lite polycarbonate body.

COMMENTS:

The SP-10's engineering is topnotch. Its fit and finish are great, and its differential is incredibly efficient (especially when Corally metric-pitch pinions and gears are used). Although the SP-10 isn't very durable and can't be adapted very well to different surfaces, updates are in the works. The car is a snap to work on (literally—with all the E-clips!), but I'd like to see a better battery tie-down system. Adapters are available to allow the use of standard BBS-style rims, but they add weight to the drive line. The aerodynamic Bolink 962 body is a real asset, and the Twister motor and New Wave cells make an exceptional power package.

me, because it had several innovations. First, the axle is made of solid graphite and doesn't have an aluminum tip. Instead, it's threaded and machined to

accept diff nuts and E-clips, which are used in place of setscrews and locknuts to secure the tires/rims to the axle. Coupled with Corally's unique



SP-10

A rubber boot on the top of the T-bar provides the rear damping. It's filled with silicone to smooth out the rear suspension. The pinion is longer than usual, because the spur gear is positioned further from it.

drive-plate/rear-wheel assembly, this setup eliminates the need for hubs. The standard drive hub has been replaced by a "driver" plate (a conical device) that's fitted to the drive side.

You adjust the diff in the usual way (i.e., by tightening the nut). Then you slide the wheel over the axle, pressure-fit it to the driver plate and secure it to the outside of the axle with an E-clip. Unlike typical rear ends that have inboard bearings (e.g., those of the 10L, the Lynx, etc.), the SP-10 has bearings at the ends of its axle. This improves the drive line's linear stability and makes the axle run incredibly true.

Two rubber O-rings prevent the steel differential rings from slipping. You don't have to glue or pin the diff rings in place, because the driver plate and the axle flange have been routed to accept the O-rings. When the O-rings are in place, install the diff washers and the spur gear. The diff rings ride against rubber instead of metal, and this provides excellent vibration damping.

Because Corally's spur and pinion gears are machined not molded, their teeth mesh precisely. The

pinion-gear mesh is very efficient, and this increases speed and improves acceleration. The spur gear rides on 12 balls, which have been inserted from both sides: six on one side and six on the other. What's so special about this? The differential ball holes haven't been drilled all the way through each side of the gear! Because of this setup, the spur gear doesn't wobble back and forth like standard spur gears do. Unfortunately, the Corally gears are 48-pitch metric, and they won't mesh with standard 48-pitch gears. I switched to a set of Du-Mor standard 64-pitch gears.

THE GEAR

To prepare the SP-10 for a road test, all I had to do was install the electronics and a Pro-Line* front bumper and paint a body. I commissioned Richard Muise of

Motion Graphics* to prepare a Bolink* Porsche 962 Lite body for this project. If you're looking for a hot roadcourse body and an award-winning paint job, this is the perfect combo. My car's beautifully detailed and prepared body is a real show stopper!

I chose my trusty Futaba* 3PB PCM radio (with a 132 servo in front) and a NOSRAM* DNS International Torque speed controller, which is a fully proportional unit with three integrated circuits and eight high-spec FETs. It also has an adjustable torque limiter that comes in handy on low-traction surfaces.

I chose a motor from Twister's* new Blueprint series. Each "blueprinted" motor starts as a high-quality, Yokomo-based, hand-wound modified motor.

Then it's taken apart and adjusted using all the high-tech manufacturing and tuning tips. A lengthy instruction sheet and a variety of brush-and-spring combinations for specific track applications are also supplied.

For batteries, I bought a couple of 1700mAh 6-cell packs from New Wave Cells*. Disgusted with the high prices and poor selection of quality cells, brothers Mike and Joe Marciante started this company to provide attractive alternatives. This company offers competitive numbers at reasonable prices. I suggest that you check out their batteries the next time you're in the market for high-quality packs.

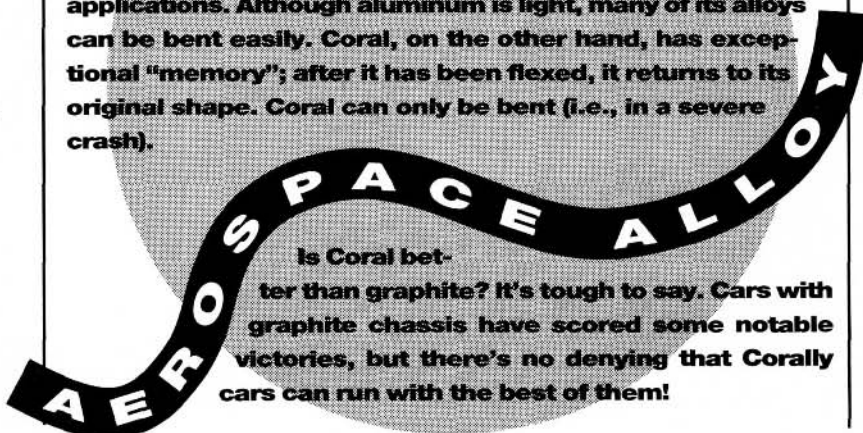
ROAD TEST

With my gear in tow and my reputation on the line, I

In this age of high-tech composites such as graphite and carbon fiber, it's unique that the chassis and front-suspension parts on Corally R/C racing cars are made of a material called "Coral." This special, aerospace-grade aluminum alloy is reported to have a better strength-to-weight ratio than many of the composites now in use.

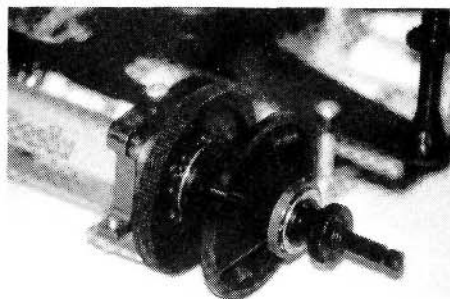
Because it's strong yet light, Coral was originally used in ships and by the Royal Air Force in a variety of fighter-plane applications. Although aluminum is light, many of its alloys can be bent easily. Coral, on the other hand, has exceptional "memory"; after it has been flexed, it returns to its original shape. Coral can only be bent (i.e., in a severe crash).

Is Coral better than graphite? It's tough to say. Cars with graphite chassis have scored some notable victories, but there's no denying that Corally cars can run with the best of them!



headed for the weekly race at Mike's Speedway in Hadley, MA. I set up the SP-10 chassis according to its instructions, and I put it through its paces. I've run several chassis on this track, so I knew what it would take to be competitive. After a few laps to trim the car and to dial-in the steering, I let the SP-10 rip.

Although I had miscalculated the gearing for this



To prevent them from slipping under acceleration, the diff rings ride on O-rings in the hub and axle. The thrust bearing is completely enclosed in the rear wheel to protect it from dirt. To adjust the diff, you turn the nut on the axle. Most axles have a metal sleeve into which a thread has been cut, but the thread has been cut right into this graphite axle.

motor, I was impressed by the way the SP-10 came off the corners. With the ESC's torque control on its maximum setting, acceleration out of the corners was awesome. I didn't have to regulate the torque control because the carpet had extremely high bite, and the SCAT* tire compound was doing its job well. Unfortunately, the ESC's instructions were vague about recommended settings and specs, so I had to adjust the car by trial and error. With torque dialed out of the system, the car was a real dog off the turns. At

(Continued on page 110)

Team Astro Sweeps The NATS

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IEDA Drag Racing Fall Nationals

Colton, Ca. Nov. 3, 1990

National Speed Records

Top Speed Unlimited Rail 71.02 Mph Roger Rose, Astro Top Fuel II Motor
Low E.T. Top Fuel Rail 1.981 Sec. Mike Ogle, Astro Top Fuel I Motor

Track Record Oct. 28, 1990

Low E.T. Unlimited Rail 1.820 Sec. Roger Rose, Astro Top Fuel II Motor

IEDA Nationals Winners

1st Place.....Pro CompEric WiemsAstro Top Fuel I Motor
2nd Place....Pro CompRoger RoseAstro Top Fuel I Motor
1st PlaceTop Alcohol Rail.....Brian Reeter....Astro Top Fuel I Motor
1st PlaceTop Fuel Funny Car...Eric WiemsAstro Top Fuel I Motor
2nd Place ...Top Fuel Funny Car...Calvin Grant ...Astro Top Fuel I Motor
1st Place.....Top Fuel DragsterMike OgleAstro Top Fuel I Motor
2nd Place....Top Fuel DragsterMike RussoAstro Top Fuel I Motor
2nd Place....Unlimited DragsterRoger RoseAstro Top Fuel II Motor

NR/CTPA World Championships

Champaign, Il. Sept. 30, 1990

1st Place..... 2WD Modified.....A. JanickiAstro Pullmaster I Motor
2nd Place ... 2WD ModifiedDutch EsagroAstro Pullmaster I Motor
3rd Place 2WD Modified.....David Hester ...Astro Pullmaster I Motor
1st Place.....2WD Open IKyle Haynes.....Astro Pullmaster I Motor
3rd Place2WD Open IMarcia Arman Astro Pullmaster I Motor
1st Place.....2WD Open II.....Jim Bee.....Astro Pullmaster II Motor
2nd Place....2WD Open II.....Scott Weigel.....Astro Pullmaster III Motor
3rd Place ... 2WD Open II.....G. KinseyAstro Pullmaster II Motor
1st Place..... 4WD Open ISean CullenAstro Pullmaster I Motor
2nd Place.... 4WD Open IDon Fisher.....Astro Pullmaster I Motor
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SCOPING OUT

by JOHN RIST

Novak's 610-RV

MISS PIGGY needs reverse! At RC Hobby II Raceway, we have a one-car-type class of racing based on Kyosho's Sideways. The rules are simple: cars must be box-stock apart from their ball bearings and speed controllers (SCs). Everyone is encouraged to decorate his car with a cartoon driver; I chose Miss Piggy, painted my car pink and decorated it with hearts and flowers. I installed the Tekin ESC 610 SC, which is a small *hot* performer that has forward-only with brake—no reverse.

Sprint cars, with their large, open wheels, are easy to overturn, and every time a wheel hits a rail, Miss Piggy takes a tumble. Having to wait for the turn marshall to pluck Miss Piggy's nose out of the wall and head her on her way was a definite handicap! The box-stock rule

allows reverse, and the Novak* high-frequency Model 610-RV SC with reverse looked hot enough to satisfy Miss Piggy's need for speed and would also allow me to get her off of the wall.

Before installing the Novak 610-RV, I ran my "Scoping Out" tests to see whether it was as good as it looked. It has these features:

- 12 Megafets: eight forward and four reverse
- High-frequency FET switching
- Proportional forward and reverse
- Built-in BEC
- Adjustable reverse delay from 0 to 3 seconds
- Built-in red and green LED pulse checker
- Tamiya-style battery connector and bullet-style motor connectors
- Built-in electronic thermal shut-down to protect against overheating.

The controller comes with: an instruction book, a universal receiver-plug kit, motor capacitors, a heat sink, adjustment-hole plugs, mounting tape and *hot* Team Novak decals.

I always look inside an ESC, and I found the Novak 610-RV easy to open just by removing the four screws in the bottom. Don't open an ESC unless you're familiar with miniature electronics, because there are many small parts that can be damaged.

The Novak 610-RV truly has space-age miniature electronics. Inside the case are two printed-circuit boards that are connected with gold-plated riser wires and pin sockets. Most of the parts are surface mounted, which means they have

flat leads that are soldered flush with the board's surface. The leads don't go through the board, so parts can be mounted on both sides of it.

If you consider its size in relation to the

number of features the Novak 610-RV has, you'll agree it's a true marvel of miniaturization.

The two halves of the bright-orange case are sealed with a rubber gasket. The controller isn't waterproof, but with the supplied adjustment hole plugs in place, it should be able to ward off most of the grime and dirt that comes its way.

It's now time for a trip to the "Scoping Out" lab (see the side panel for a description of the lab's setup).

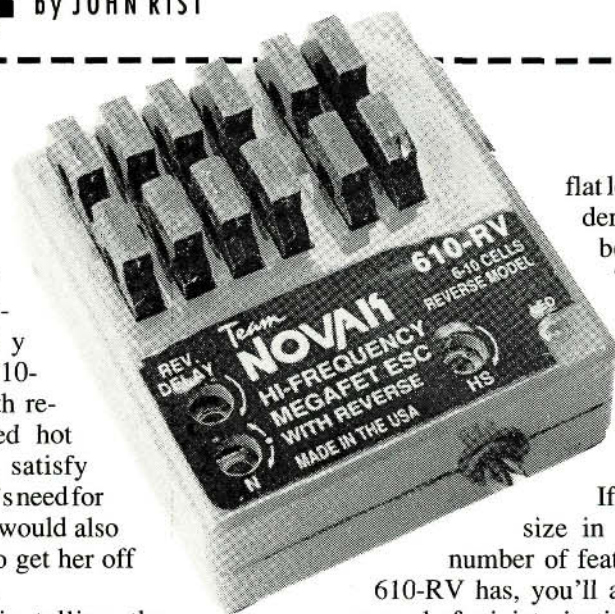
LAB TESTS

Before you can test an ESC, you must get it to operate. This all-new ESC has many new features, so I read the first-class instruction book thoroughly before trying to connect and adjust it. Novak's diagrams are some of the best I've seen. An excellent illustration shows the controller connected to the battery and the motor. The illustrations also show the correct way to install the three motor capacitors. Novak emphasizes that using the three capacitors is mandatory if you want the controller to survive.

A good chart shows the proper setup of most of the popular pistol-grip radio transmitters. These very detailed instructions and factory-installed motor and battery connectors should make it possible for all R/C car drivers—even novices—to install the Novak 610-RV.

VOLTAGE-DROP TESTS

With the Novak 610-RV operating nor-



THE "SCOPING OUT" LAB

John Rist's lab consists of:

- an oscilloscope
- a digital voltmeter
- a resistor load bank
- a 6V 30-amp electricity supply
- a Pit Stop Radio servo/speed controller tester.

The oscilloscope is used to monitor the controller's output and to guarantee that it's fully on.

The digital voltmeter takes all the voltage-drop readings and verifies the reading on the current meter.

The resistor load bank consists of 40, 12-ohm, 5-watt power resistors, which can be switched on and off one at a time to vary the load between .6 amps and 20 amps, but the standard 12 amps are usually used.

In series with the resistors is a 25-amp Simpson current meter and a 1-percent .01-ohm resistor. By measuring the voltage drop across this resistor, the current-meter's reading can be double-checked. Of course, the lab power supply provides the test current.

mally in my test setup, I was ready to take some voltage-drop readings. I always take the readings at two points: first, along the full length of the wires (including connectors); second, 2 inches along the wires. The first reading establishes the performance level of the stock controller; the 2-inch reading is used to compare controllers, and it also demonstrates the power-robbing effect of long wires.

Pumping 12 amps through the Novak 610-RV, the end-to-end reading provided a voltage drop of 0.26 volt. This calculates as a resistance of 0.021 ohm. At 2 inches along the wire, with 12 amps still flowing, the reading was 0.18 volt—0.015 ohm. I checked some past "Scoping Out" articles, and it looks as if the Novak 610-RV has a lower resistance than any other reversing ESC that I've so far tested. (*Editor's note:* The PDI Turbo Zeta has a lower resistance, but it requires a second battery pack if you want reverse to work. The Turbo Zeta is a monstrous unit intended for large pulling trucks and high-voltage boats.) With a resistance this low, the Novak 610-RV should be a real "trick" controller when used to replace the standard mechanical SC in your favorite road burner.

Overheating is always a real concern with ESCs. Reversing speed controllers are especially susceptible to overheating because they have a much higher resistance than forward-only racing-style ESCs. The Novak 610-RV's resistance is lower than those of most reversing controllers, but it might still cause overheating. It was time for my "let-it-cook test."

LET-IT-COOK TEST

For this test, I increase the current from 12 to 20 amps. I often run this test without a heat sink, but Novak warns that the heat sink is necessary. It's vital because you never know where Novak has put the thermal sensor that controls

the automatic shutoff. If you use the heat sink, you'll spread the heat evenly among the 12 FETs. This way, they'll all stay at the same temperature and, regardless of where the thermal sensor is, it will detect overheating and pull the plug.

Without providing any air cooling for the heat sink, I let the Novak 610-RV cook for 15 minutes, after which it was very hot, but still operating normally. It's expected that a reversing ESC will get quite warm when run hard, but with its heat sink in place and plenty of cooling air, the Novak 610-RV should stay well within safe operating limits.

DEAD-SHORT TEST

No matter how careful you are, sooner or

later, something will go wrong to cause a near short on the motor leads. It's therefore important that an ESC be able to survive this kind of abuse.

To simulate a jammed gear or a fried motor winding, I put a jumper lead across my resistor load bank. With this in place, the current jumps to a smoking 40 amps. I ran the controller with the shorting wire in place for two minutes to see if I could get the thermal shutdown to kick in. After two minutes, the controller's heat sink was too hot to touch, and smoke was coming out of the Tamiya-style battery connector—but the 610-RV was still operating normally! If you're having so much trouble that the smoke is starting to

(Continued on page 76)

High Fashion For High Speed



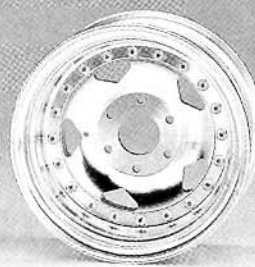
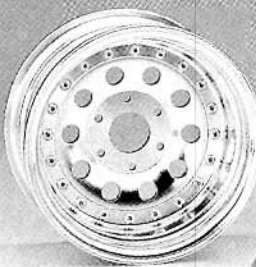
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(Continued from page 75)

roll, get your finger off of the trigger and find out what the problem is!

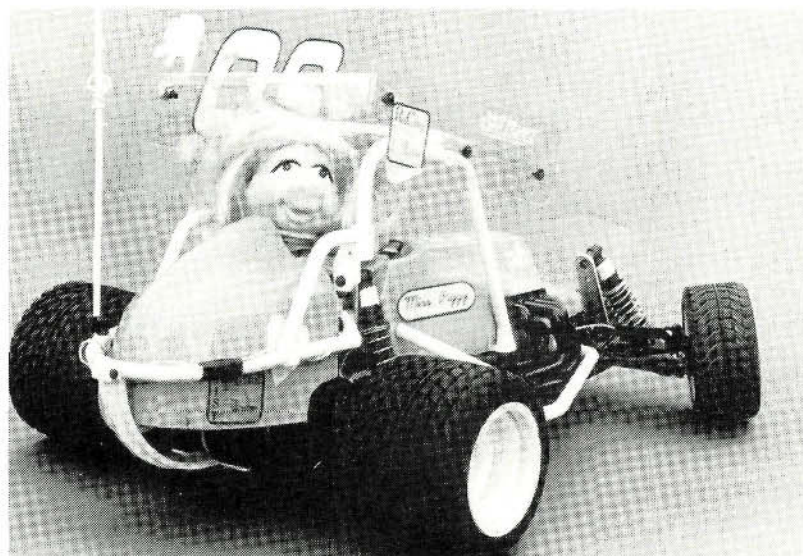
IN-CAR TEST

With the testing completed, it was time for some Sunday afternoon racing fun. As I said, my local track now has a racing class based on the Kyosho Sideways, and to keep things fair, owner Rick Chambers has bought a dozen or so Equalizer motors—the new sealed motor that's hop-up-proof. Rick oils the motors before each race and hands them out as you pay your fee. At the end of the day, the motors go back into the boxes until next week's race.

To get ready for the race, I installed the stock motor and my shiny new Novak 610-RV. A careful reading or two of the instruction book should solve any installation problems. All my batteries are set up with Litespeed connectors instead of the stock Tamiya-style connectors, and I direct-wire my motor. To do this, I had to remove the Novak-installed connectors. This brings me to one "sticky" point: Novak gives many strong warnings throughout the instruction book that reversing the voltage or cross-wiring your ESC will void its warranty. This sounds harsh, but Novak can't be expected to take responsibility for user error. The

"sticky" part is that if you change the plugs properly and have an unexplained failure after several runs, how do you prove that the plug swapping was done properly and had nothing to do with the failure? We hope the folks at Novak will be fair about warranty repairs; help them by fairly and accurately reporting the circumstances of any failure. You might also consider *not* changing the plug until after the 90-day warranty has expired.

It's easy to change the connectors on the Novak 610-RV because it has four wires of different colors for the battery and motor: red and black for the battery; yellow and blue for the motor.



Miss Piggy is happy because she now has a Novak 610-RV under the hood and can reverse when she gets stuck on a wall.

With the controller installed and the Pig tearing up and down the street in front of my house, I took the opportunity to play with the reverse delay. This is a useful feature because it provides you with real brakes if you want them. If you set the reverse delay to maximum (3 seconds), the Novak 610-RV provides normal braking action for 3 seconds until reverse kicks in. With reverse set to instant (0 seconds), it's possible to slam between reverse and forward and make your car pull wheelies. This forward-to-reverse slamming is fun, but it will destroy a transmission. I settled on a .5-second delay, which gave me some brakes,

NOVAK 610-RV

DIMENSIONS:

Height
(with heat sink) 1.19 inches
Width 1.68 inches
Length 1.76 inches
Weight (with wires
and heat sink) 2.8 ounces

TUNING:

Access to Controls Excellent
Ease of Adjustment Good

PRICE:

Sug. Retail Price \$165
Warranty 90 days

COMMENTS:

If you're looking for a *hot* reversing speed controller, the Novak 610-RV is for you. Its "on" resistance is lower than that of any speed controller in its class that I've tested. It's ideal for racing classes that permit or require the use of reverse. Not only is it a *hot* performer, but it's also loaded with features like adjustable reverse delay and high-frequency motor control. The Novak 610-RV is truly a new, improved reversing speed controller.

ELECTRICAL:

(Manufacturer's Specs)

Max Voltage 12 volts
(10 cells)
Min Voltage 7.2 volts
(6 cells)
Max Current
Forward 200 amps
Max Current
Reverse 100 amps
Resistance 0.009 ohm

TEST PARAMETERS:

Voltage 6 volts

Current 12 amps
Voltage Drop,
end to end 0.26 volt
Voltage Drop
at 2-inch point 0.18 volt
Calculated Resistance:
(Voltage Drop /
Current = Resistance)
Resistance to
end of wires 0.021 ohm
Resistance at
2-inch point 0.015 ohm
BEC Voltage,
6-cell pak 5.01 volts

yet kicked into reverse rather quickly if I needed it to get out of trouble.

THE PIG PACKS A PUNCH!

With everything ready, I headed to the track. With the race fee paid and the Equalizer motor installed, I joined six other cars in the Sideways Class. (This guaranteed everyone a ride in the A-Main.) With my son Joe (age 20) driving, Miss Piggy came in 2nd, 1st and 2nd, in the three heats.

As racing luck would have it, she finished 3rd in the Main, but using the reverse *did* pay off: it got Miss Piggy going after a bad tangle with a wall and salvaged 3rd place for us. With the Equalizer motor, this wasn't an "acid test" for overheating, but a Sideways car is heavy, and the body fits tightly around the speed controller, and this could cause overheating. I checked the heat sink after one of the runs, and it was just a little warm—sound evidence of the Novak 610-RV's low resistance. With the heat sink installed and the controller in an adequate, cooling airflow, you shouldn't have any overheating problems.

To further test the 610-RV's ability to withstand abuse, I installed my Race Prep 13-turn triple motor and dumped a 6-cell SCR pack through it. The Novak 610-RV did get hot, but it stayed well within safe limits.

If you're looking for a really hot reversing ESC, Miss Piggy recommends the Novak 610-RV. High-frequency motor control and low resistance in a reversing-style speed controller make a winning combination. The high-frequency motor control provides extremely smooth throttle response, especially at lower speeds, and its motor armature and brushes last a lot longer. Novak has been a leader in ESC design for some time, and the new high-frequency, reversing Novak 610-RV is definitely exciting. If you have to replace a burnt-out mechanical SC, this new offering from Novak will put the fun back into your buggy.

*Here's the address of the company featured in this article:
Novak Electronics Inc., 128-C E. Dyer Rd.,
Santa Ana, CA 92707.

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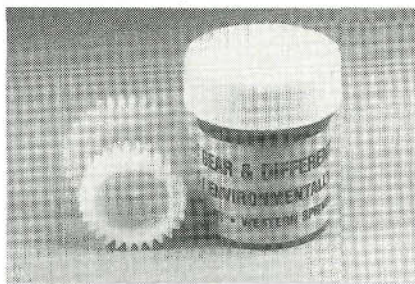
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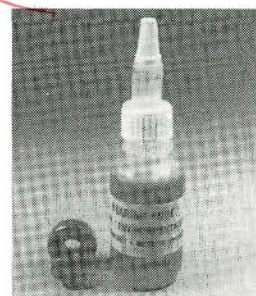
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MICKY THOMPSON

(Continued from page 23)

Class (for drivers over 40 years old); he was the only one who posted 13 laps coming out of the qualifiers.

Jim Nichols, a Super 1600 driver in the full-scale MT Series, won the R/C Invitational Race for Mickey Thompson Drivers. (Jim drives a Bolink-sponsored Super 1600 for Bob Rule.) Obviously, the Bolink edge had rubbed off on Jim: he came from behind to win the Invitational

by quite a margin, and that evening, despite being seriously out-punched by the lead cars, he put his full-scale Super 1600 into 5th place.

FULL-SCALE FASCINATION

The track was right next to the full-scale pits, so between rounds, R/C drivers peered at the scale cars being prepared for a night of battle. Qualifying rounds went on throughout the day, and there was an endless line of off-road vehicles going to and from the stadium track—all easy prey

to the lens of a quick camera.

It was absolutely fascinating to see the number of body panels and body supports held in reserve for each truck. We counted enough spare panels for Ivan Stewart's Toyota truck to put a new body on it six times over! Do you think the body on your truck is only good for a couple of races? These guys know theirs will be thrashed in the first qualifier.

For the fun-loving bunch, the NORRCA folks obtained discounted tickets for the

(Continued on page 86)

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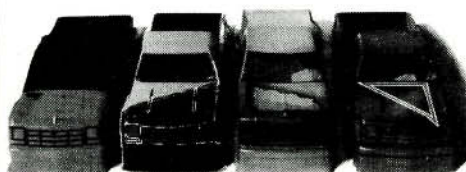
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T R A C K R E P O R T



SCHUMACHER

SHOTGUN

by MIKE LEE



HIGH-STEP

STOMP!

THE INTRODUCTION of racing trucks is one of the reasons for off-road racing's rocketing popularity.

These big ground-pounders came to life when the full-size Mickey Thompson Stadium trucks became a national institution, and now they're here to stay. The R/C racing-truck class is still blooming, and new designs appear almost monthly. Not all are pure-bred racing trucks, but the Schumacher* Shotgun definitely is.

Schumacher is no stranger to off-road racing. Its Cat and

Cougar have been discussed in this magazine before, and they've made their marks in off-roading. It was only natural for Schumacher to design a truck with the same innovative thought that was given to the buggies. The result is the Shotgun, which is based on the Cougar chassis.

In the March '91 issue, the Cougar got a good report card, and I expected the Shotgun's performance to be just as good.

Its chassis and its front- and rear-end design are basically the same as the Cougar's, but its tranny has been modified to take the rigors of off-road truck racing. Now it's time for a tour of the Shotgun's assembly.

ASSEMBLY

The kit comes in a colorful box, and it includes more than just a rolling chassis. Something this large has to include a body, and it does—a Parma stadium-style truck body.

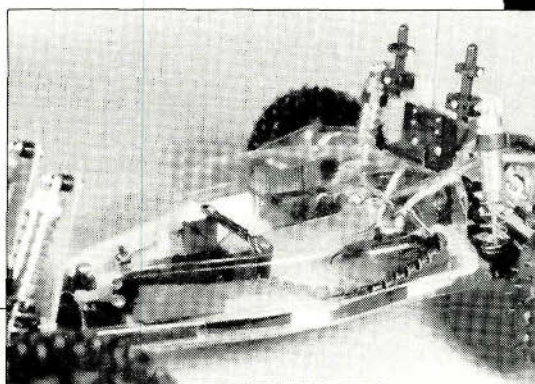
The illustrated, 20-page instruction manual includes details on assembly and set-up steps. When you look at the illustrations, there's little doubt about how or where the parts are supposed to fit. In fact, you can check that you're using the correct screw or bolt by comparing them to the illustrations for sizing—nice touch!

"REARED" PROPERLY?

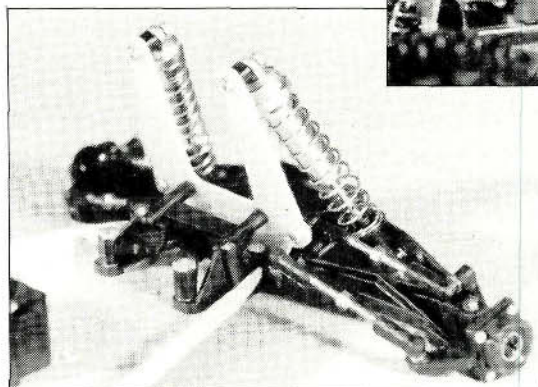
Start by assembling the rear suspension. First, attach the main rear bulkhead to the aluminum chassis and follow this with the rear shock mount and the rear wishbones (A-arms). The tempered-aluminum mini-tub chassis is more than rigid enough to withstand the tortures of off-road racing. The shock mount is made of fiberglass, and the bulkhead and wishbones are molded of reinforced plastic. To link the wishbones to the chassis, you pin them to the pivot blocks. Although the pivot blocks seem too small, on closer examination, you'll see that their strongest points are where the loads from the wishbones are imposed. (No sweat here!)

Remember to use a thread-locking compound when you mount the components. The truck uses many aluminum or plastic nuts and bolts that rely only on tightening to hold them. The use of thread-locking compound on the metal fasteners will ensure that the truck doesn't lose its entire rear end during a race.

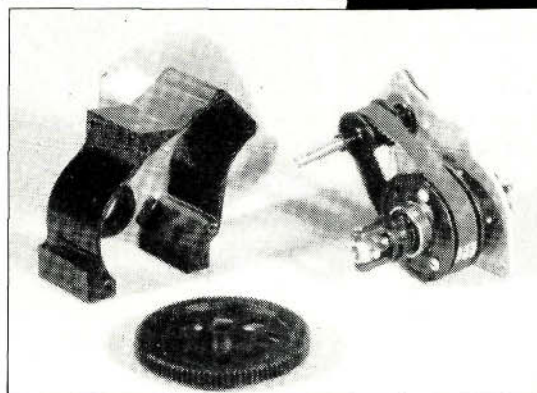
Next, mount the rear hub carriers and the



The Shotgun's dust cover fits like a glove. An air intake scoop in the middle of it allows cooling air to enter.



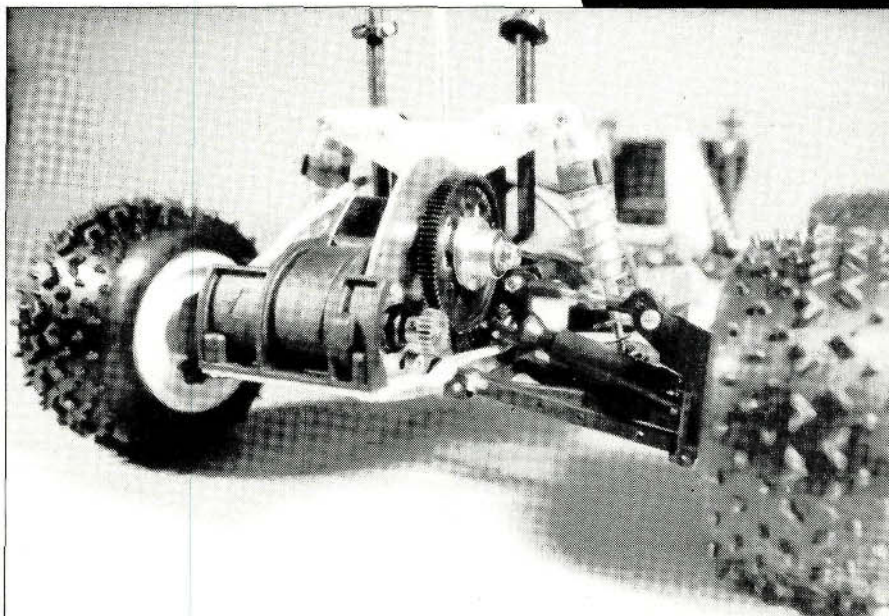
The Shotgun's unique front end allows you to adjust rake by adding or removing spacers behind the shock tower. Notice that there are only two mounting holes for the upper control link.



The Shotgun's tranny shows the simplicity of its design. The belt runs smoothly between two cogs and minimizes the gear train's power loss. This improves acceleration.

upper links. You should identify these parts before you look for them in the box: the British names for some of them are different from ours. For example, I went bonkers looking for a "rose joint," which is just another name for a ball joint.

The turnbuckles have marks that let you know which way they're supposed to be turned when you adjust them. This is a first-class setup! The rear hub carrier uses bronze bushings to support the axle. I replaced these imme-



The rear of the tranny has a conventional setup—a spur gear and a pinion gear. Here, the Super Diff kit and the slipper clutch have been installed.

SCHUMACHER SHOTGUN

Type 2WD off-road racing truck
Scale 1/10
Sug. retail price \$349.95

DIMENSIONS:

Overall Length 17 inches
Width 12.25 inches
Wheelbase 11 inches
Front Track 9.75 inches
Rear Track 10.125 inches

WEIGHT:

Gross (with battery) 3 pounds,
 14 ounces

BODY:

Type Parma stadium truck
Material Polycarbonate

CHASSIS:

Type Mini-tub
Material Aluminum

DRIVE TRAIN:

Primary Spur/pinion
Transmission Belt drive
Differential 14-ball internal
Bearings/Bushings Bronze bushings

SUSPENSION:

Type (f/r) Wishbone with upper link
Damping (f/r) Oil-filled, coil-over shocks

WHEELS:

Type one-piece nylon
Dimensions (DxW) 2.2x2 inches

TIRES:

Front Vee-4 Blue Naturals knobby
Rear Vee-2 Blue Naturals knobby

ELECTRICS:

Motor Not included
Battery Not included
Speed Controller Not included

OPTIONS AS TESTED:

Airtronics CS-2P radio; Tekin 411P ESC; Quarter Flash 17-turn HTM modified motor; Pure Tech battery straps; Schumacher Super Diff kit; 6-cell SCR battery.

COMMENTS:

This highly competitive racing truck is easy to assemble. It handles very well and has excellent acceleration off the line. The Super Diff kit is worth installing: The Shotgun will see a lot of action at the track and will appear regularly in the winners' circle.

diately with Schumacher ball bearings.

I had to trim many of the plastic parts to remove the molding flash. It was a trivial task—except for the shocks. I had to smooth the pistons' edges and eliminate the flashing using fine sandpaper so that they would move freely in the shock body. This is extremely important because, if the shock action isn't smooth, the vehicle *won't* work! When I had assembled the shocks, I filled the damper with 20WT oil.

UP FRONT...

First, attach the wishbones to the lower, molded-plastic suspension plate. A large pivot pin allows them to move freely. The front-wheel steering blocks are on the tips of the wishbones. The front wheels are mounted on a surprisingly small spindle, but don't worry; the rotating part is well-supported by a massive front bushing, which, along with the other front bushings, I replaced with ball bearings.

The Shotgun has an interesting feature. You can adjust its front-end caster and its rake by adding (or removing) small spacers to the bolts that are used to attach the shock tower to the bulkhead. Thus, you can adjust the rake from 15 degrees off-center to 25 degrees, which is a big advantage when you dial-in the truck.

With the lower assembly in place, add the shocks, the steering links and the adjustable upper control links to complete the front end. Again, check that the shock action is smooth.

THE TRANSMISSION

The Shotgun's heart is its transmission! It has only two internal belt-drive cogs. The

upper cog is connected directly to the main spur gear, and the lower, main cog is the differential, and is linked directly to the axles. The internal cogs aren't the same as those found in the Cougar.

They're bigger and wider to handle the tremendous loads imposed by truck racing. The fiber-reinforced belt probably won't stretch very much.

After the truck has been assembled, you have to remove the universal joint and adjust the diff through the axle opening. The diff balls are already lubricated, which is a nice touch (there are 14 of them inside the main cog!). The diff action is good and should be trouble free. When you join the diff rings to the drive plates, the rings lock into place. The hole in the middle of each ring is hexagonal, so they can't slip.

The main spur gear engages the motor pinion in the usual way, and it's protected by a molded-plastic gear cover. The gears are standard 48-pitch gears. The whole tranny worked extremely after its bushings had been replaced by bearings.

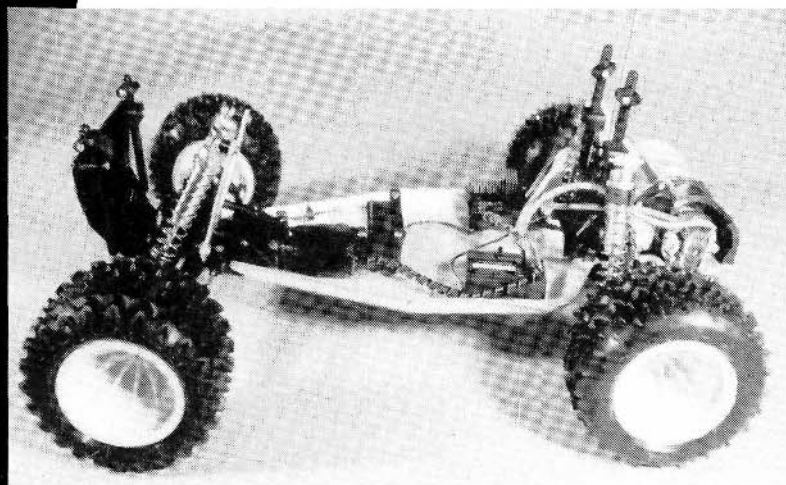
When you've mounted the tranny to the chassis, fit the telescopic universal shafts to the rear axles (again, I replaced the bushings with bearings), and mount the body-mounting posts and the other parts. The body posts are unique. Not only is their height adjustable, but each one also has a pivoting body washer that prevents the post from scratching the paint or damaging the body during a crash. Other manufacturers should take note.

GEAR—GLORIOUS GEAR...!

I chose the FM version of Airtronics'*

XL-2P radio—the CS-2P pistol-grip radio. It has exponential adjustment, end-point adjustment, neutral adjustment and servo-reversing on throttle and steering; brake-point adjustment on throttle; and an adjustable grip. Now, if you don't know what exponential can do for you, let me say this: once you've learned how to use it, you won't want to drive any other way! Expo-

(Continued on page 127)



The Shotgun is ready to go (and win!). There's plenty of room inside it for electronics and stick-pack or saddle-pack batteries. The tires provide effective traction.

MICKY THOMPSON

(Continued from page 78)

Mickey Thompson race inside the stadium—much more exciting than watching it on television.

The entire deal made for a day of racing fun and excitement. This type of public exposure ensures that newcomers will continue to stream into R/C racing. Our thanks to Dan Moynihan, J.R. Sitman and the NORRCA gang for their valuable support of our sport, and for providing a great public image that will ensure a successful future for R/C racing. ■

PROJECT YOKOMO

(Continued from page 33)

guide, Richard Muise sat down, and after a good whiff of some potent paint fumes, he peeled off this blazin' body.

I attached the body and undertray to the chassis according to the instructions. I joined the halves with a strip of Velcro®, which is flanked by a strip of foam. This foam barrier protects the inside of the chassis from dirt. A pair of HPI* light mounts and wing buttons hold the wing

in place. I mounted the wing mounts to the rear of the rear shock instead of to its front so that the wing is more toward the back of the car. This increases the amount of rear downforce and helps to keep the car flying level over big jumps.

PERFORMANCE

The Project Yokomo's first run took place at the Ranch Pit Shop in Pomona, CA. On the day of the photo shoot, the track hadn't been groomed for racing, so its surface had a layer of loose dirt and was somewhat slippery. Although I didn't run in full racing conditions that day, there's no room for anything less than full throttle when you're trying to take some blazin' action photos. At the hands of Kyle Reed, the ROAR National Truck Champion and Team Losi driver, the Yokomo was put through its paces. The car seemed to run extremely well, but the real test would come under racing conditions.

After a long flight back to the East Coast, I tested the Yokomo at a local racing facility, and this is where the effects of the car's modifications really became evident. The track had a moist, medium-bite surface, which provided better traction than the one at the Pit

Shop. The front suspension modifications gave the Yokomo a faster steering response and the trademark 4WD "push" was greatly reduced. The Associated shocks improved suspension travel, but after a couple of test runs, they also caused some problems that eventually cost more than just the shocks.

As the suspension is compressed, the dogbones slide farther into the drive cup. Under favorable conditions, this isn't a problem, but under racing conditions, it is. If there's any flexing in the A-arm when the suspension is fully compressed, the dogbones bottom out in the differentials' drive cups. This can cause the universal-joint dogbones to bend. With a price tag of over \$30 a pair, they're expensive to replace. To prevent this, I had to limit suspension travel by installing spacers on the shock shafts.

Aside from this minor problem, however, the Yokomo ran like a champ! It handled air time very well (without going in nose first), and it got inside the turns much better than it ever could have in its stock configuration.

In short, all the modifications turned this car into a machine with superior handling. Approach the parts list for this

(Continued on page 98)

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CUT & TRIM LEXAN



by RICHARD MUISE

Even though Lexan bodies have been around for several years, many people still have trouble finishing them. Overspraying, or cutting jagged wheel openings have ruined many a first attempt. The Car Action editors have planned a series of articles designed to show you how to create a truly awesome body, and they've enlisted the help of one of the country's top painters—Motion Graphics' Richard Muise. He'll explain how to paint bodies from start to finish, and he'll reveal the tricks he uses to make them look so great. This month, Richard shows you how to cut and trim Lexan bodies. In the next

three issues, he'll explain masking, painting and detailing so you'll be able to make your car look like those of the pros.

BEFORE YOU start cutting, cover the body with plastic wrap to protect it from being scratched. Trim the body before you paint it; that way, if you accidentally slip with the knife, you won't scratch the paint job that you worked so hard on. Now, remove the flashing on the lower edge. There are a couple of ways to do this, the best of which I call the score-and-fold method.

• **Scoring and folding.** Snap off the tip of a hobby-knife blade

WHAT YOU'LL NEED

- Hobby knife
- Lexan scissors
- Flexible straightedge (a ruler or a small drafting triangle)
- 1/4- or 1/2-inch masking tape
- Wheel-well template
- Black fine-point permanent marker
- Sanding block
- Medium sandpaper

1 To cut and trim Lexan, you'll need masking tape, curved scissors, a hobby knife, sandpaper, a reamer, a ruler, plastic wrap and pens. (You'll need sandpaper to smooth the cut edges and a tapered reamer to make perfect holes.)



2 Before starting to cut, protect the outside of the body with plastic wrap.



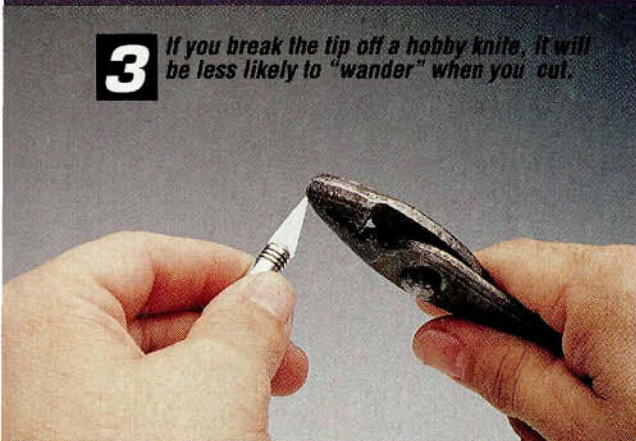
so that it won't wander as easily when you score the body. It looks better if you score the body just above the cut lines that are usually molded into the Lexan, and it's easier to do this if you put the body on a flat surface. Make a single pass, use a firm stroke, and don't cut all the way through. If you fold the Lexan away from the scored side, it will snap off easily.

Trim all the straight areas first, i.e., between the wheel wells, across the rear, across the front (if it's straight), and then from the wheel wells to the corners. Go straight across the wheel-well areas, but don't cut out the wheel wells, yet. (This helps keep the body rigid while you paint, and it protects that area from overspray.) Work toward the corners, and try to make the scored lines meet one another. Since it's easier to work with small sections in the straight areas, create a "flap" by cutting straight up to the scored line, and then, snap the Lexan off.

- **Using special scissors.** Scissors designed to cut Lexan work well on vehicles that have a lot of curves, e.g., off-road vehicles and some of the full-fendered classics. Unless the body has a molded-in trim line, mark the cutting line with tape or a permanent marker, and snip with short strokes. For long, straight sections, regular scissors work well. When you've finished cutting, smooth any rough edges with a small sanding block and medium sandpaper.

- **Body mounts.** Like many of my customers, rather than drilling holes in the body for the mounts, I almost always use Velcro®. Put a large flat washer or a piece of aluminum on top of a standard body mount. Drill a small hole through the center of the mount, and attach the washer with a small self-tap-

3 If you break the tip off a hobby knife, it will be less likely to "wander" when you cut.



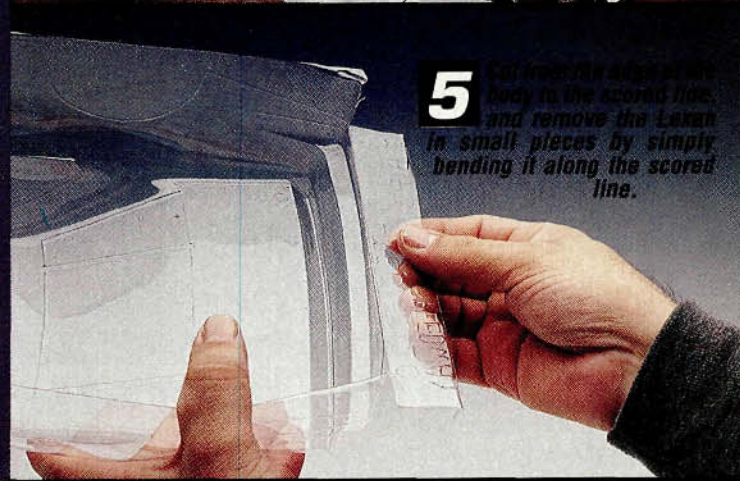
7 Curved scissors are great for getting into tight areas where you want to cut a curved edge. Use a fine-tip marker to draw the cutting marks.



6 To make it easy to cut straight, apply masking tape to the body. This is especially useful in areas where you can't use a straightedge.



5 Cut from the edge of the body to the scored line, and remove the Lexan in small pieces by simply bending it along the scored line.



4 When making long straight cuts along the bottom of the body, guide the knife with a straightedge or a small triangle. Remember that you only have to score the Lexan; don't cut right through it.



CUT & TRIM LEXAN

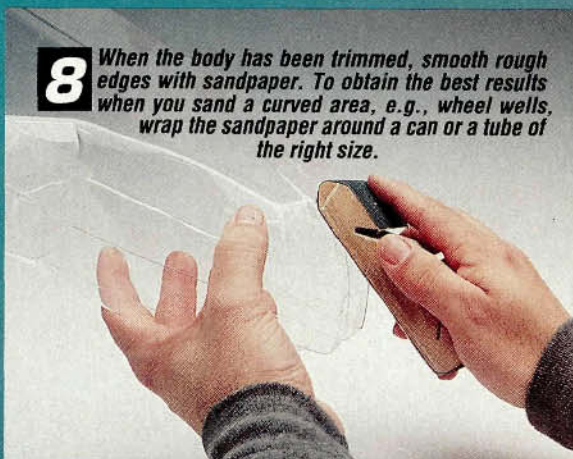
ping screw. Apply an adhesive Velcro® dot to the washer that's on top of the body mount, and put one on the inside of the body to match it.

If, however, you plan to race your vehicle on rough terrain, use the standard mounting method: drill holes in the body for the mounts, and use pins or nuts to secure them. (It's easier to do this before you paint the body.) First, locate and mark the body-mount positions on the outside of the body. To start the holes for the mounts, slowly rotate a hobby knife to make a 1/8-inch hole. Use a reamer to en-

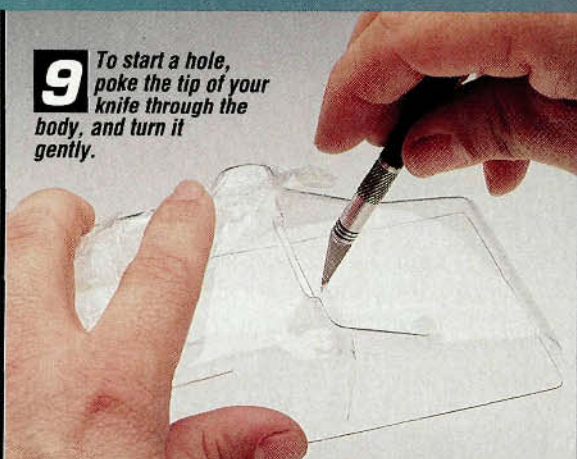
large the hole to the proper diameter. If you use a drill, slowly bore a small hole, then switch to progressively larger drill bits until the hole is the right diameter. If you don't do this on a slow speed setting with progressively larger bits, the drill bit can catch on the body and rip it.

After you've cut the body and marked the body-mount

8 When the body has been trimmed, smooth rough edges with sandpaper. To obtain the best results when you sand a curved area, e.g., wheel wells, wrap the sandpaper around a can or a tube of the right size.



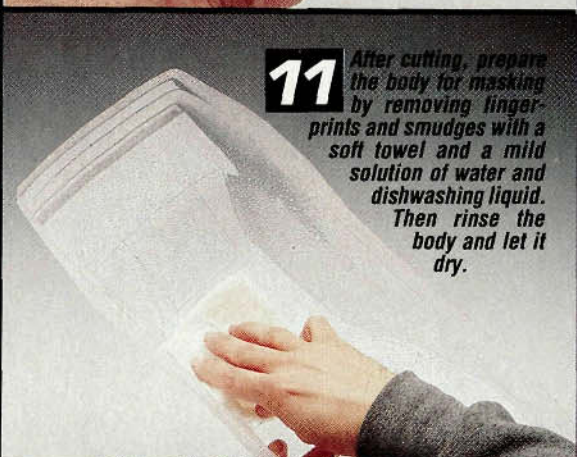
9 To start a hole, poke the tip of your knife through the body, and turn it gently.



10 Enlarge the hole to the correct diameter with a tapered reamer, which is available at Radio Shack and will make perfect holes up to 1/2 inch.



11 After cutting, prepare the body for masking by removing fingerprints and smudges with a soft towel and a mild solution of water and dishwashing liquid. Then rinse the body and let it dry.



location, clean and prepare the body for masking. Use a clean sponge or a soft cloth, and wash the inside with a mild solution of water and dishwashing liquid. Let the body dry completely, and you're ready for masking.

Next time, I'll continue with all you've ever wanted to know about masking—and more. ■

MUSINGS ON MUISE

Richard Muise has been an artist/illustrator for more than 20 years. He's also a successful commercial interior designer, and he has had extensive experience in marketing and sales. In the late '60s, he started to perfect his airbrushing techniques, and he spent several years custom-painting automobiles, vans and motorcycles.

In 1986, Richard became interested in R/C cars (he was an avid modeler as a child), and he began to custom-paint cars for hobby shops. In 1988, he realized a lifelong dream of combining his artistic talents with his marketing skills when he formed Motion Graphics. Richard has painted more than 1,500 R/C car bodies (each is unique), and now he's painting R/C helicopters and boats, too. Some of his cars are

on display at hobby shops, and they can also be seen at trade shows. His orders come in from customers all over the U.S. and from as far away as France.

Richard and his staff do more than custom painting; they also design logos and signs as well as interiors for hobby shops and racetracks across the country. Lately, he has been holding seminars in hobby shops and at the national shows to explain his award-winning custom-painting techniques.

Richard ranks *Radio Control Car Action* as the number-one R/C magazine in the industry, and he thanks all his customers for making Motion Graphics a success.



RC10

Totally Tub-ular

by JOHN HUBER

AS THE OFF-ROAD racing season approached, I decided to build a 2WD modified car using some of the new products that had caught my eye during the last year. I had already modified my three-year-old RC10 completely, so I started from ground zero with my Championship RC10. I didn't want to turn it into a heap of random after-market parts, so I used only the parts that would make it fast, sturdy and reliable.

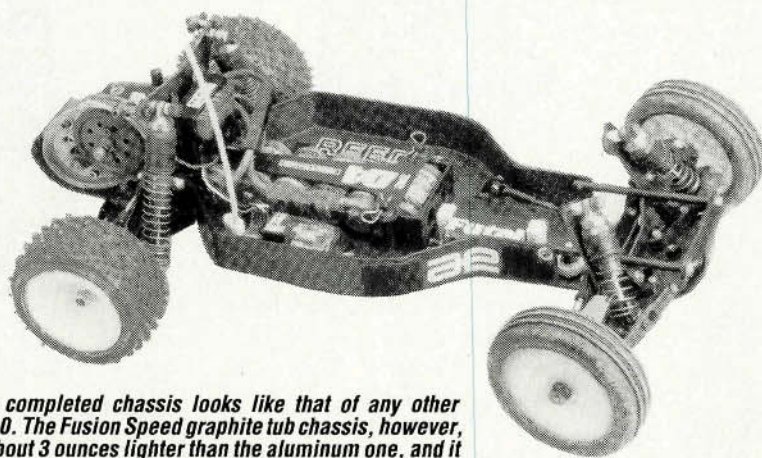
THE CHASSIS

Although the aluminum tub chassis protects the radio, it's a little heavy. Standard, plate, graphite chassis are light, but they don't protect the radio gear as well as tub chassis. I needed a *graphite*

tub chassis, and I discovered that Fusion Speed made one with the same dimensions as the Championship RC10's stock chassis! (Fusion Speed no longer manufactures this chassis, but Horizon Hobby Distributors* has a lot of them in stock.)

The quality of the Fusion chassis' graphite is good, but its edges are rough, and there are wrinkles in its sides. When the chassis is made, graphite "cloth" is wrapped around a mold. Sometimes this process causes wrinkles to develop in the chassis' side walls, and they remain after the graphite has solidi-

(Continued on page 95)



The completed chassis looks like that of any other RC10. The Fusion Speed graphite tub chassis, however, is about 3 ounces lighter than the aluminum one, and it still protects the radio equipment.

PHOTOS BY YAMIL SUED

RC10

(Continued from page 93)

fied. Also, the chassis is cut after it has hardened, and this leaves sharp, rough edges.

I've had to sand the edges on other graphite chassis slightly, but this one needed more sanding than most. When I had finished, I applied medium-viscosity CA to seal the edges and to fill any imperfections in the graphite. The chassis looked great, and the only thing left to do was to drill mounting holes for the Associated* Stealth transmission. (Although the chassis' instructions state that drilling holes in it will void the warranty, Horizon assured me that drilling holes for the Stealth transmission won't.)

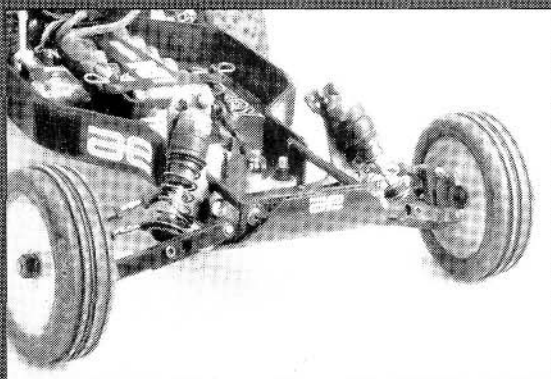
THE "STUFF"

Next, I mounted the Championship RC10's parts on the new chassis, and I didn't use the tranny, the battery box, the shocks, the steering rack, the linkages and some of the hardware (I used Team Pit Stop* hardware instead).

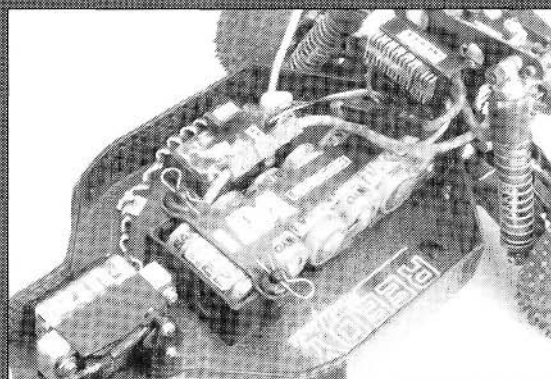
One of the benefits of working at *Car Action* is that I have a chance to examine the pros' cars. We recently obtained one of Masami's RC10s, and I've spent many lunch hours studying it. To hold the battery pack in place, Masami uses a graphite brace that's as long as a pack. It fits into the rear bulkhead, and it's secured with two body clips. Although the brace reinforces the chassis slightly, its main purpose is to hold the pack securely in place, even if the cells aren't glued together. I sent a photocopy of Masami's brace and a template for a tranny brace to a company that could make them for my car—DA Graphite*. (I wanted to use a graphite tranny brace instead of the stock nylon one.) The rear of the chassis is a little thin, and I've heard that it tends to break. I hoped that a graphite tranny brace would prevent this. To protect the chassis' front end, I added a JG* Kydex mini-bumper.

Instead of using the stock battery box, I substituted a similar one from Andy's R/C*. It has two mounting posts that accept body clips and two extra mounting holes that enable you to move the box forward slightly if the battery pack doesn't fit properly (nice feature!).

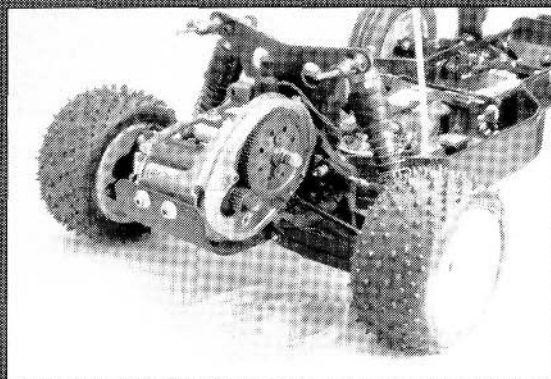
Recently, I saw a car that had a very interesting two-piece Lexan gear cover. Made by Island Hobbies*, one half is bolted to the motor mount, and the other is snapped onto it. (The halves seal more efficiently than those on any other cover I've seen!) With a quick yank, you can



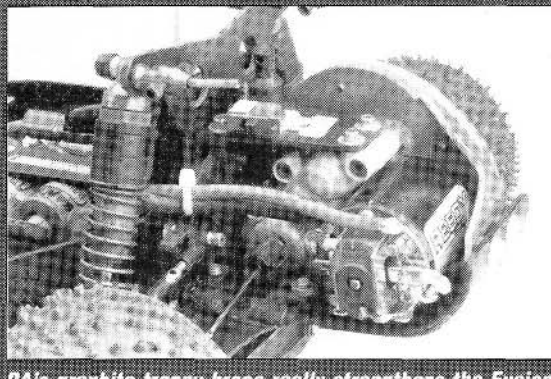
JG's Kydex bumper (cut down slightly) protects the chassis' front end, and HPI's cone washers help prevent the nose-brace tubes from damaging the chassis. Notice the RPM Quick Adjust Shock Clips.



The DA Graphite brace holds the battery pack in place. With this holder, your saddle packs won't pop out. Notice the Lexan receiver cover that's made out of a 9V battery package.



You can remove and replace Island Hobbies' gear cover without using tools. One half is bolted directly onto the motor mount, and the other half snaps onto the first. Again, notice how the HPI cone washers secure the chassis' rear.

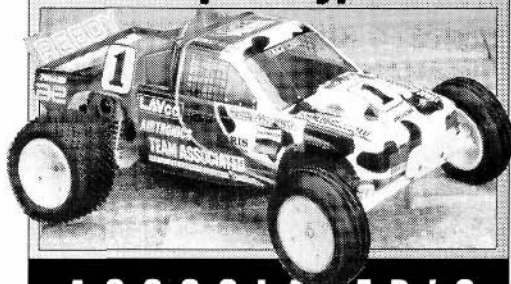


DA's graphite tranny brace really strengthens the Fusion Speed chassis' rear end. Notice how the brace touches the rear shock tower. This increases the strength of the entire rear-end assembly. HPI's unique wing mounts have two bolts that are drilled to accept heavy-gauge wing wire.

COMING NEXT MONTH!

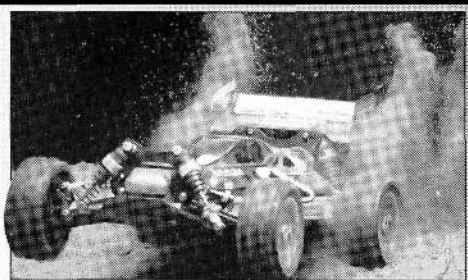
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easily remove the cover to adjust the slipper or change the pinions. To mount the cover on the motor mount, I recommend that you use thin double-sided carpet tape in addition to the mounting methods described in the instructions.

SUSPENSION

I copied Masami's suspension setup. To allow positive camber rise when the suspension is compressed, the upper linkages are shorter than usual.

Although I found some Tecnacraft* linkages that were short enough, I still had to cut some of them (not easy!).

Initially, I used Du-Bro* 4-40 fixed rod ends, but some of them broke. I switched to Du-Bro's heavy-duty adjustable ends, and where those wouldn't fit, I installed Parma* heavy-duty ends. Those from Du-Bro have screws on their ends that allow you to remove any slop but, in some locations (i.e., next to the rear wheel), the screw touches the tires' rims. HPI* offers an awesome assortment of light cone linkage spacers for links of all sizes. They help you to align the rods during installation, and they allow the links a full range of movement. Also, their cone washers and concave washers help to prevent the screws from damaging the chassis' front and rear ends.

I used A&L's* bellcrank steering system because it works extremely well. Its molded-nylon arms and graphite cross-brace make it extremely rigid. To complete the system, however, you'll have to buy four 1/4x3/8-inch ball bearings.

I installed a set of Associated's new Team shocks. Their hard-anodized coating won't wear away, and it makes them incredibly smooth. During a hard landing, one of the car's universal shafts bent, so I added a Yokomo* shock seal to the rear shock. This acts as a bumper when the shocks are fully compressed. I use RPM's* new Quick Adjust Shock Clips because they come with a variety of spac-

PARTS LIST

A&L bellcrank steering system (no. 1080)
Airtronics Caliber 3P radio
Andy's battery box (no. 3467)
Associated Stealth transmission (no. 6560); Team shocks (nos. 6431 and 6433).
DA Graphite battery holder; tranny brace; front and rear shock towers
Du-Bro adjustable rod ends (no. 2136)
Fusion Speed RC10 graphite tub chassis (no. FUS 1000)
Futaba FP-131 servo
HPI aluminum parts: cone washers (no. A-MA004); cone linkage spacers (A-MA003); concave washers (A-MA006); wing-wire mounts (A-MA009).
Island Hobbies Lexan gear cover for the RC10
JG Kydex mini-bumper (no. A-02)
Parma rod ends (no. 12803)
Reedy Mr. A 14-turn triple motor (no. 508)
RPM nuts 4-40, 6-32, 8-32 (nos. 7080, 7082 and 7084); Quick Adjust Shock Clips (no. 7022).
Team Pit Stop aluminum hardware set (no. 5000)
Tecnacraft tierods (no. 10-06)
Tekin 411P speed controller
Yokomo silicone shock seals (no. ZC731)

ers. You can easily adjust the spring tension by adding or removing spacers.

GEAR

I have two Futaba* PCM radios that I've used in countless cars but, for this car, I broke down and bought the new Airtronics* Caliber. It came with standard servos, but they weren't strong enough for my taste. Although Airtronics plans to introduce new servos that are

supposed to be great, they weren't available, so I used a Futaba FP-131.

I used the Tekin* 411P speed controller that I've been swapping between cars for the past few months. I'm still experimenting with motors, but I've had good results with Reedy's* Mr. E and A.

PERFORMANCE

I conducted the tests at the Queens Off-Roaders indoor track in Long Island City, NY. This hard-packed clay track has some serious jumps, and my new car has taken a major beating. I've broken two fiberglass rear shock towers (eventually, I had to replace them with graphite towers) and a few ball links, but the chassis shows no signs of damage after many crashes. (Believe me—I've put this car to the test!)

One of this chassis' interesting features is that it's adjustable. Horizon told me that by changing the number of spacers between the motor mount and the chassis' rear end, you can adjust the rear suspension's anti-squat angle. To adjust the front-end kick-up, just change the number of spacers between the nose-brace tubes and the front end. I haven't experimented with these adjustments yet, but I will.

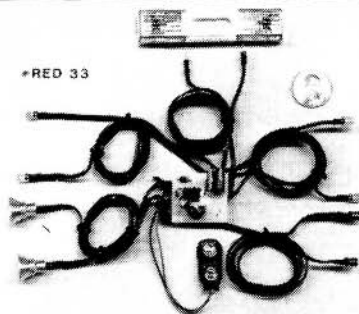
The tires that I used (see action photos) might have some of you puzzled. They're made of foam and have a central groove around their circumference. I saw them in a Japanese R/C magazine and decided to

(Continued on page 136)

NEW PACE CAR 10 LIGHT SET

Add the excitement of a Pace Car to your collection of car bodies. This set includes 2 #RED 19 Headlights with aluminum reflectors, 2 tail lights with red lenses, 4 flashing hazard lights with amber lenses and a #RED 07 Light Bar with 2 flashing bulbs and an adjustable rate flasher all wired into one system. You can use a 9 volt alkaline battery or a 6 or 7 cell car nicad pack for power.

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PROJECT YOKOMO

(Continued from page 86)

project with caution, however, if you decide to update your car. You should fully understand what each part will do for the car so that you can decide whether your car really needs it.

*Here are the addresses of the companies mentioned in this article:

Yokomo; distributed by Associated Electrics, 3585 Cadillac Ave., Costa Mesa, CA 92626.

Cbrally; distributed by Du-Mor R/C, Inc., 1002

Union Landing Rd., Cinnaminson, NJ 08077.

RPM, 14978 Sierra Bonita Ln., Chino, CA 91710.

Jammin' Jay Halsey Products; distributed by Team

Losi, 13848 Magnolia Ave., Chino, CA 91710.

Boca Bearing, 7040 W. Palmetto Park Rd., Boca Raton, FL 33433.

Team Losi, see above.

Tecnacraft, 1335B Dayton St., Salinas, CA 93901.

Associated Electrics, see above.

Pro-Line USA, P.O. Box 456, Beaumont, CA 92223.

Tekin Electronics, 970 Calle Negocio, San Clemente, CA 92672.

Reedy Co.; distributed by Associated Electrics.

Robinson Racing Products, 165 N. Malena Dr., Orange, CA 92669.

Futaba Corp. of America, 4 Studebaker, Irvine, CA

92718.

Motion Graphics, 2645 Robert Arthur Rd., Westminster, MD 21157.

HPI, 22600-C Lambert St., Ste. 904, El Toro, CA 92530.

TAMIYA TYRRELL

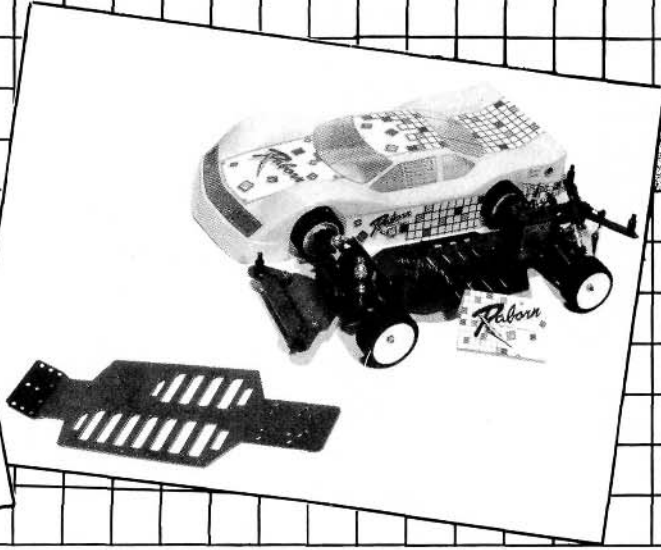
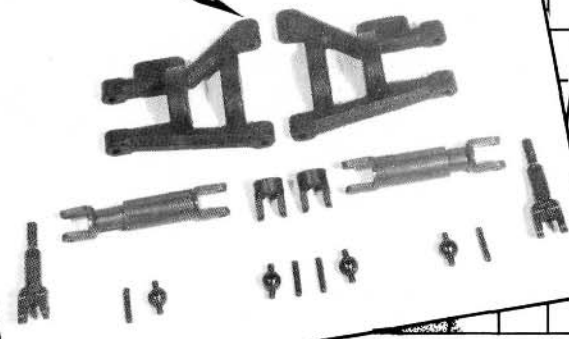
(Continued from page 40)

take your time when you cut them out, because there's only one set. (The pictures show you their correct positions.)

(Continued on page 106)

Raborn

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Raborn Racing Originals
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Bellaire, TX 77401
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Oval Products

\$59.95	1000	RC-10 Lefthand Oval Chassis
69.95	1001	RC-10 7 & 4 Oval Slotted Chassis
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**This pond
skimmer is
no rock!**

ROBBE unlimited HYDRO

by DOUG SAMRAH

UNLIMITED HYDROPLANES are some of the most exciting boats around—in “real life” *and* in model form. One great example of R/C “thunderboats”—or “pond skimmers,” as I fondly refer to them—is the Robbe* Unlimited Hydroplane.

THE KIT

After opening the box and holding the hull parts together, I realized something—this is a *big* electric-powered hydro! It's 32½ inches long, and

there are so many parts in the kit that it takes more than one picture to show them all! The workmanship is first-class: the parts are all sharp, and there are many cleanly die-cut pieces—nothing shabby here!

ASSEMBLY

The directions tell you to start by building a heavy-duty stand. (There's nothing worse than having a weak stand to support countless hours of work!)



PHOTOS BY DOUG SAMRAH

unlimited HYDRO



SPECIFICATIONS

Type: Hydrofoil

Length: 32.7 inches

Beam: 15 inches

Weight: 5 pounds

Hull Material: ABS plastic

Power Req'd: two 6- or 7-cell battery packs

No. of Channels Req'd: 2 (throttle and rudder)

Sug. Retail Price: \$169.95 (basic); \$199.95 (with hardware)

Features: a two-piece, vacuum-formed, hydrofoil hull that looks like a full-size racer; twin EF-7611 540 motors; single, fixed shaft drive; two-speed, high-amp, stepped, microswitch speed controller.

Comments: the Robbe Unlimited is more stable than other boats of this design, but turning it left at full speed flipped it, and the radio box isn't completely water-resistant. Use the slotted motor-mounting holes to simplify the final engine and gear-mesh setup.

The company has included instructional drawings, and this saves building time, because you don't have the hassle of creating the templates. (Well done, Robbe!)

After you've built your stand, set it aside for finishing and begin the hull assembly. The instructions recommend that you use Stabilit Express for this, but I had some 4- and 15-minute Hobbypoxy*, so I used them instead. As always, the choice of adhesive is up to you.

First, lightly sand the plastic, and then glue the transom and turn-fin doublers into the lower hull. To make the front longitudinal strips, refer to drawing "Z" on the full-size plans. Instead of cutting them out of the plans, I transferred the strips onto slightly

"The company has included instructional drawings, and this saves building time,..."

opaque See-Temp* material. I had to cut a little extra off the strips where the cross-piece goes. Trial-fit the pieces, and you'll have no problems. (When you've finished, tack up the plans so you can refer to them throughout the assembly and avoid making mistakes.)

When the strips are in place, trim the bottom of the hull. Cut straightly and accurately—I use scissors and a knife—and *be careful*. A cardboard jig, or support, is included in the kit to help you align the upper and lower hull halves. Simply run CA around the seam, and when it's dry, cut off the horizontal flash. Next comes

no one's favorite job—trimming, sanding and filing until the seam is smooth!

Cut out the large rectangular area behind the driver, and sand the edges. This is where the inner cradle—which holds the motors, batteries and radio gear—goes. Trim the cradle to fit, and install it. Now apply glue to the inside of the hull seam, and drill a hole for the stuffing tube through the inner cradle and the hull.

DRIVE SYSTEM

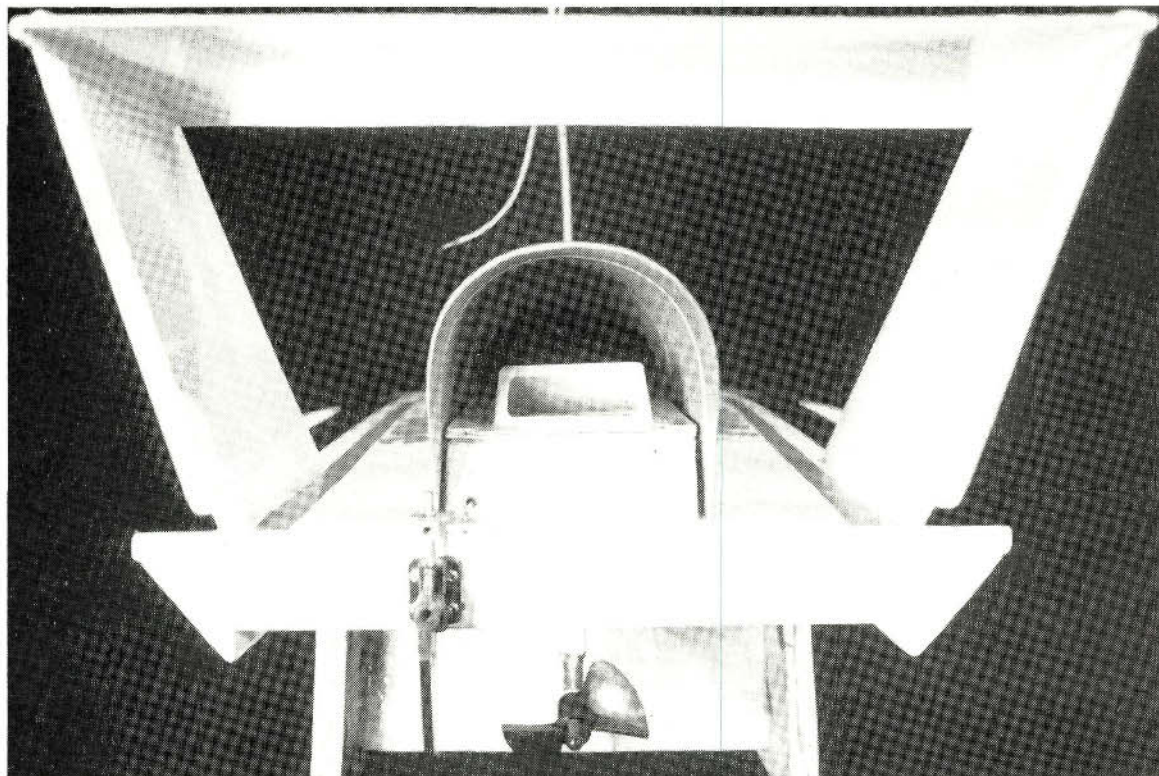
The two EF-7611 motors come with stator rings that must be removed before you attach them to the motor/gear-drive bulkhead. (It's

unfortunate that the rings won't fit, because they focus the magnetic field in the motor cans and improve motor performance.)

Next, put suppressors on the motors to protect the radio from electrical interference. (There were none in my kit.) Interference of any kind can definitely wreck a model and spoil your weekend!

(Editor's note: Robbe reports that all 1003C Deluxe kits include motors and suppressors as stock items.)

Wire the motor leads as shown on the plan sheet.



An aft view of the offset rudder, the prop and the air outlet under the turbine cover.



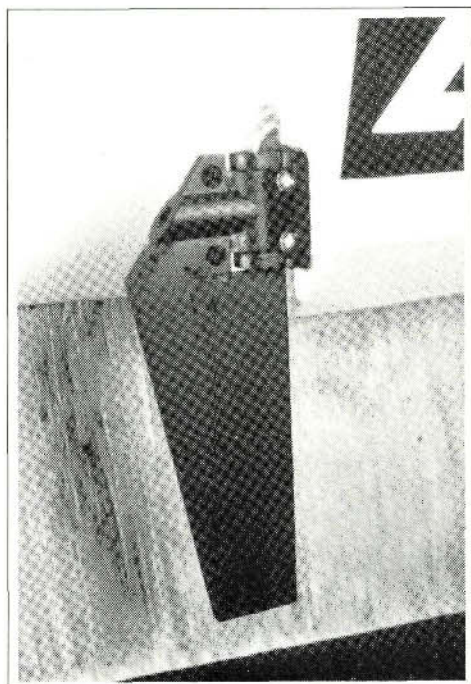
unlimited HYDRO

“The Robbe Unlimited Hydroplane is fun to run and looks terrific as it skims the water.”

Make sure that the leads are long enough to reach from the motor to the speed controller. Attach your connectors, and screw the motors onto the gear-drive bulkhead.

washer, the main gear, another washer and the other nut. When you tighten this assembly, it locks the main gear onto the prop shaft. Make sure the gear stays as straight as possible and doesn't twist. Slip the shaft into the stuffing tube, and adjust the pinion-gear mesh as lightly as possible, but make sure that the teeth are properly meshed.

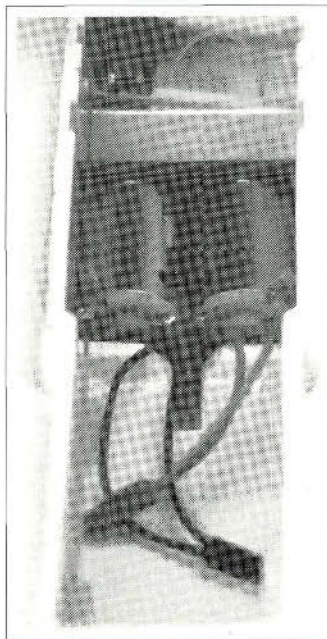
Now you're ready to install the prop shaft and cradle in the hull. Make sure they slide in easily without causing the stuffing box to bind, and apply instant glue to the cradle at the top where it touches the



The turn fin attached to the right sponson.

Then fit the pinions onto the output shafts. File a flat on the motor shafts for the set-screws to seat onto, and remember to use a thread-locking compound. Check that the motors turn in the proper direction, as shown on the plans.

Connect the stuffing tube to the motor bulkhead. To ensure that the prop shaft is lubricated for every run, I drilled a hole and soldered on an oil-filler tube. Thread a nut onto the end of the shaft, followed by a lock



The twin motors in place. Note the oil-filler tube that leads to the stuffing box.

hull. Push the motor bulkhead as far back in the groove as it will go, and glue it into place. Use epoxy to seal the hole where the shaft tube goes through the bottom of the hull.

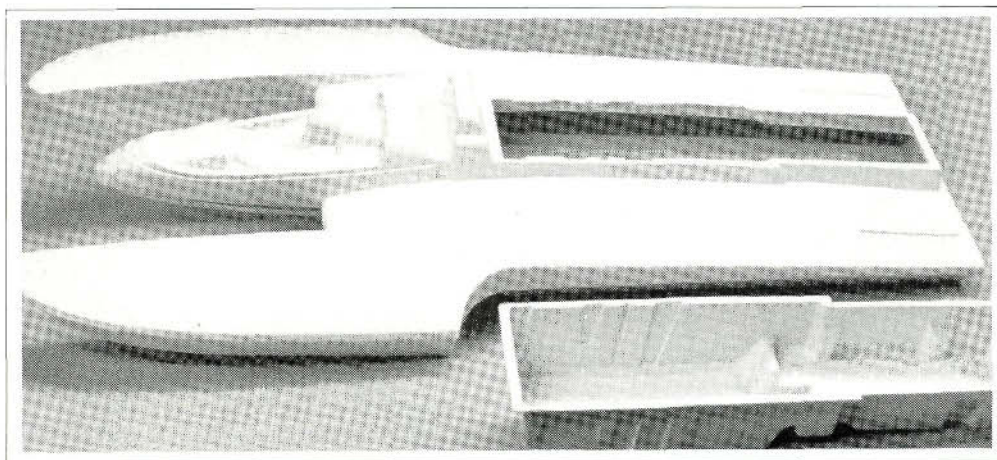
RADIO INSTALLATION

Now set up the steering servo, but make sure everything is in the right place before you start gluing. The radio area is extremely confined, so use microcomponents. I attached the servo mounts to the servo first, and then glued them into the cradle. Make sure

you have room for the microswitch servo and the receiver, and remember that only a flat receiver battery pack will fit without alterations.

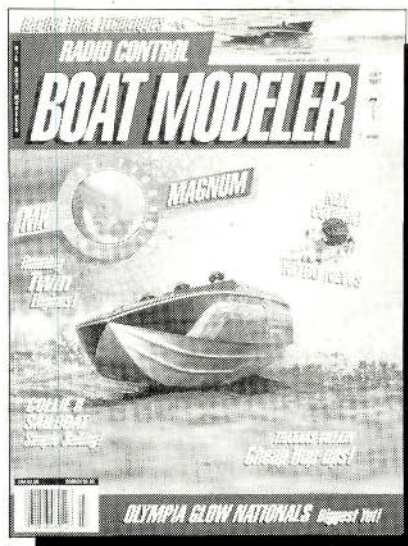
The steering linkages are set up next, so drill a hole at the rear of the transom through the outer hull and cradle. The rudder pushrod comprises two pieces of wire, the lengths of which are adjusted with a locking collar. The guide tube is glued to the inside of the cradle. (I used epoxy to make sure it stayed put.)

The sliding hatch is made with the die-cut plastic parts. You just run your knife carefully along the lines and separate the pieces. If you look at the detailed drawing on the plan sheet, you



The assembled hull with the inner cradle box in the foreground.

For more information about R/C boats, check out *Radio Control Boat Modeler*—one of *Car Action's* sister publications.



won't have any problems.

You're supposed to install the radio switch now, but I chose to wait until the final radio installation, so I simply cut the holes. The second hatch has ventilation holes to provide an airflow over the motors and the batteries. Unfortunately, this leaves the radio in the open, but so far, this hasn't been a problem. Set up the engine cowl/turbine cover next; you can drill the antenna holes now or later.

The rudder and turn fin are

the front canards and the rear wing (this is easy), paint the driver and the cockpit. I painted the canopy white along the windshield outlines, and it looks very sleek.

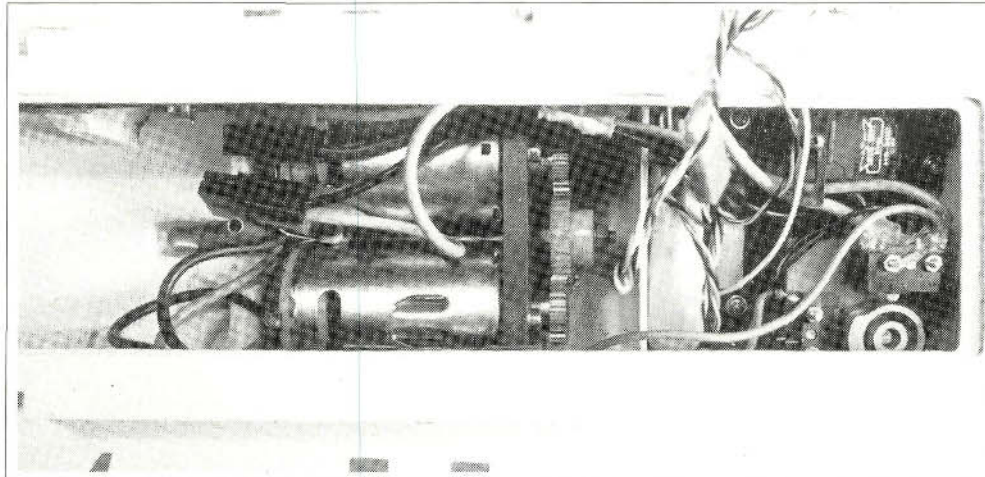
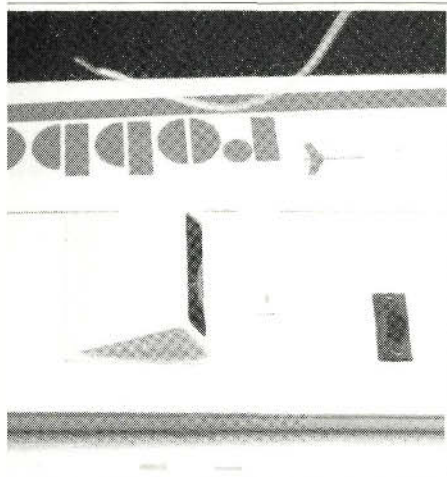
Now finish installing the radio and the antenna, and make sure everything works smoothly. Mount the antenna carefully: I put a screw-in-type antenna with a metal base on the middle of the hatch, but it was too close to the wires for the microswitch speed controller. To avoid mistakes, take your time and

so I only had time for a few quick runs. I found out right away why you don't turn hydroplanes sharply to the left! The kids at the pond thought it was great to see the boat turn upside-down! I really thought I would have to go for a swim, but the boat

The boat was a little tricky at first, but after a few runs, I really enjoyed it. Like most hydroplanes, it runs best on smoother water, and you might have

to trim it by putting weights fore and aft to suit the water conditions. The motor still seems tight, so I'll just have to keep working on it.

The Robbe Unlimited Hydroplane is fun to run and looks terrific as it skims the water. Forget about looking



installed next. To ensure that they stay where they're supposed to, file flats on any surfaces the setscrews touch. I ran into some trouble with the turn fin: you're supposed to bend the shaft to a 90-degree angle so it locks into the sponson, but I broke mine and had to use some old shaft material instead. Be careful with this step! Install the washer, prop and prop nut onto the shaft, and be sure to tighten the nut with a wrench.

After you've assembled

think things out.

Now you can apply the decals, which really dress-up the boat. Working carefully, apply soapy water to ease decal positioning, and be sure to work the bubbles out from the center of each one. If you press down the outside first, water or air can be trapped in the middle, and it's time-consuming to get them out.

ON THE WATER

The Unlimited's first time out was late in the evening,

stayed afloat, and the wind blew it to shore. The combination of being rigged to race clockwise and having a turn fin on the right tends to lift the left sponson in a *full-speed* left turn. At reduced speeds, the boat turns well in both directions.

Remember that I said the radio box was open? Well, I hadn't put my receiver in a plastic bag, so I figured that my luck had run out, but I dumped out the water, allowed the boat to dry and everything worked perfectly.

■ Above left: The radio-compartment cover with air inlets. Although it isn't waterproof, it keeps the inside cool. ■ Above right: Neatness counts in the Unlimited's tight quarters!

for any more flat stones; hurry to your hobby shop and pick up Robbe's new skimmer!

*Here are the addresses of the companies mentioned in this article: **Robbe Model Sport**, 180 Township Line Rd., Belle Mead, NJ 08502. **Hobbypoxy Products**, a division of Pettit Paint Co., Inc., 36 Pine St., Rockaway, NJ 07866. **See-Temp**, P.O. Box 105, Sussex, WI 53089. ■

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TAMIYA TYRRELL

(Continued from page 98)

THE FLYING FORD

When you've finished and your Ford is ready to fly, you'll be amazed at how fast it moves. On its first time at the track, this car took off like a bat out of hell. After a little radio trim, it tracked as straight as an arrow, and the Red Baron speed controller provided smooth acceleration in both forward and reverse. Although reverse isn't allowed in most types of racing (so I'm told), it did help me get out of some jams.

Those who like to modify their wheels will find the Tyrrell Ford limited in that respect, but its speed right out of the box will satisfy even the most speed-hungry honchos.

**Here are the addresses of the companies mentioned in this article:*

MRC/Tamiya, 200 Carter Dr., Edison, NJ 08817.
SCI Corp. of America, P.O. Box 13099, Sarasota, FL 34278.

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(Graph shown represents actual computer readout of Reedy Modifieds motor.)

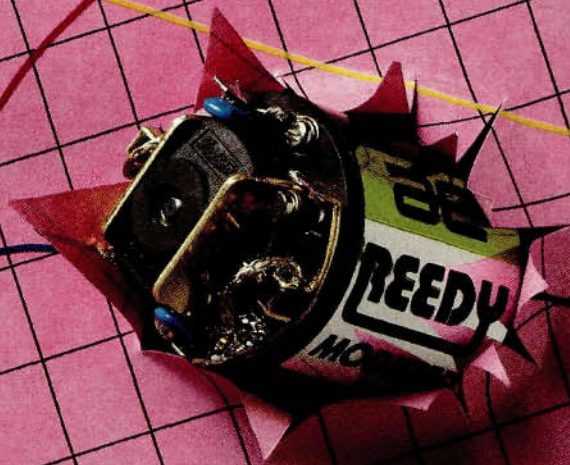
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TROUBLESHOOTING

(Continued from page 46)

gear, but the noise was still there. The spur gear wasn't worn out, but the acceleration was slow. When I put the car up on blocks, it was fine! Everything was oiled, or greased and in good condition. What's the problem?

Jimmy Lam
Smithtown, NY

Jimmy, check out my answer to William Trias. I think you may have the same problem. The car sounds good when you run it on the workbench with no load, but under the stress of acceleration, the bracket in the transmission will flex and make a grinding noise.

CORALLY SP-10

(Continued from page 73)

full max, it was a missile, and since the car was so hooked-up off the turns, I just left it there. With blue tires up front and green ones on the rear, I was able to turn the SP-10 under any car and still maintain exit speed. This caused it to peak out on the straights much sooner than I had ex-

(Continued on page 122)

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DIRT DIGEST

by BILL O'BRIEN & BOB KANE

Dirty doings

SOMETIMES, IT'S AMUSING to sit back and watch the development of new R/C car products. A good example of this is the aluminum chassis for a three-axle Clod (actually, in my case, it's for a Bull Head).

For those who haven't gotten my hints in the last few issues, I've been working on a three-axle Bull Head (why does it need three axles?—you'll have to read about it in a future issue to find out). At one point during this project, I was also working on a King Cab update that needed a chassis from Sassy Chassis*. Through an odd series of mishaps, I bought the wrong chassis. (It turned out to be an engineering prototype that Sassy had sent to its distributor, and that company had inadvertently passed it on to

ERI's* booth (ERI is a Sassy Chassis distributor). I was looking for a stretched Clod chassis. The people at the booth said that they didn't have one, and then they told me that I should have stopped by the day before. Sassy Chassis representatives had been there with a prototype of a *three-axle Clod chassis*! It's funny how things develop sometimes. To those who'll be using three-axle chassis, I'll just say, "You're welcome" now.

SPEAKING OF THE WRAM SHOW...

The great thing about the WRAM Show is that it's held here in the Northeast (White Plains, NY). The big news about this year's show is that MRC didn't have a booth. In fact, participation by the car manufacturers

able. Currently, it's a bump and grind if you try to stop and look at anything. If the "biggies" (i.e., Tower Hobbies and MRC) were to show up, WRAM might even be able to move into a respectable place like the Javits Center in New York City.

A funny thing happened on the way to the show. I saw a guy with an early-model, 1/4-scale yellow Pacesetter dragster that he *dragged* (hence the name "dragster," I guess) down the street and up the building's many steps—letting its rear wheels bounce the entire way. About half an hour later, I was walking through the show's swap shop, and guess what I saw up on the shelf? Yup—I really wanted to buy that dragster. It must have a *great* suspension!

JETS AND GIANTS

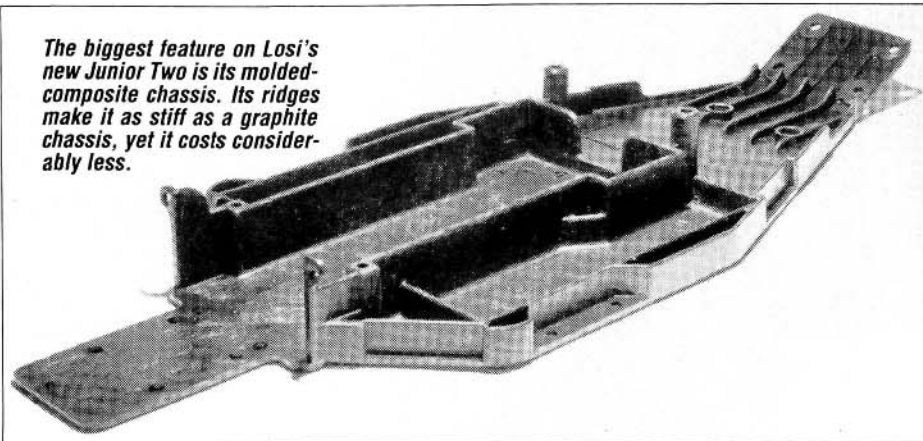
The show wasn't a total loss, mind you. I spent several minutes drooling at the Kress Jets'* booth. I've always wanted to build a ducted-fan, off-road buggy, and Kress has some mighty fine fans. One of the smallest (it was just about 1/10 scale) is powered by a Cox .049 engine, and it's very light. Hmmm...

I also stopped by the Altech* booth—wow! They were showing an Italian-designed, 1/6-scale, .45 gas-powered, 4WD, off-road truck with a Beetle body (all right, no jokes about Italian cars with German bodies). It had a pull-start engine for easy get-up-and-go, and the starter worked off the flywheel instead of the crankshaft, which is good. Best of all, the truck's list price is \$695, including the engine, so its street price should be close to that of a 1/8-scale Burns with an EX-B motor. The truck has an aluminum-pan chassis with a shaft drive similar to that of Hobby Lobby's Tornado, but bigger, and it seemed lighter than my Burns. Oh boy!

EQUAL TIME

If you ever buy a Fax machine, don't give out the number. Why not? Well, some people at Sassy Chassis read my

The biggest feature on Losi's new Junior Two is its molded-composite chassis. Its ridges make it as stiff as a graphite chassis, yet it costs considerably less.

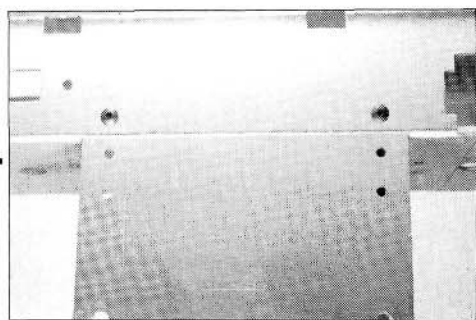


my local hobby shop.) To remedy the situation, I had to call a Sassy Chassis representative, and I also took the opportunity to ask why Sassy didn't offer a three-axle chassis along with its standard and stretch versions. I was told that there's no interest in such a chassis. I explained that I needed one for my Bull Head project, and because none was offered, I had to piece one together from two plastic chassis.

Time passed (if this were a movie, you'd see the pages on a calendar flip quickly, or the hands on a clock spin rapidly) and, at the WRAM Show several months later, I stopped by

was skimpy—and that's being generous. If it weren't for the dealers who attended and Royal's large booth, you would never have known that R/C car models existed—just planes and helicopters.

C'mon you companies out there! Many of us in the great Northeast can't go to the Chicago show. It would be nice to see what's happening and to know that someone cared enough to show us. Besides, your participation might convince the WRAM Show folks that they need to find a facility with enough parking and walk-around space to make the show more enjoy-



All Sassy Clod Buster chassis will feature bolt-on steering servo trays.

column a few months ago, and they saw the information on APM's extended ball links for Clods that have been modified with lift kits. Right away, I received a Fax that said, "Hey, we have a solution for suspension/height problems, too!" What followed were pictures, words and about 3 hours of phone calls.

The steering-servo tray on the bottom of a Sassy chassis was formerly riveted into place, but not any more. Instead, you can choose from three mounting locations at different heights. Your choice will depend on the shock-mounting location. This servo mount won't work on plastic chassis, but it's a great idea for aluminum chassis.

JUNIOR TWO

I just bought a Team Losi* Junior Two, and all I have to say is, "Wow"! I've been buying many of the JR-XT after-market parts so that I could turn it into a JRX-Pro, but now I have a better idea about what to do with those parts. It looks as if Team Losi combined the best of Kyosho's Ultima with Tamiya's 2WD technology and added their own brand of magic, too. Make no mistake; the Junior is going to be one of this year's hottest entry-level cars, and it sells for a reasonable price. It might even (gasp!) supplant the venerable RC10!

NEXT MONTH

Next month, I'll discuss some of the letters I've received, and I know there will be even more after that crack about the RC10. Keep writing; reading my mail gives me something to do when I'm not doing everything else.

**Here are the addresses of the companies mentioned in this article:*

Sassy Chassis, 204 S. Oak St., Itasca, IL 60143.

ERI Associates, Inc., 380 N. Saw Mill River Rd., Elmsford, NY 10523.

Kress Jets, Inc., 4308 Ulster Landing, Saugerties, NY 12477.

Altech Marketing, P.O. Box 391, Edison, NJ 08818.

Team Losi, 13848 Magnolia Ave., Chino, CA 91710. ■

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CORALLY SP-10

(Continued from page 110)

pected, but changing the pinion gear solved the problem.

The car has fast steering response. Corally recommends center-point steering, with the steering arms positioned at a severe downward angle to the servo-saver. This contradicts any Ackerman setup that I know of, so I was surprised by the car's stability down the straight. Part of this can be attributed to the car's narrowness (8.3 inches) and its smooth differential. The car is very responsive, so you'll need extra stick time to get a feel for it.

With a quick gear change and a fresh pack, I was ready for my first qualifier. There were no surprises; the SP-10 was a rocket out of the box! With just the right amount of steering dialed-in, I ran the low groove and still pulled the other cars down the straights. (In a 4-minute race, being able to run 4 or 5 fewer feet in each circuit really adds up!) After a few more qualifiers and a 2nd-place finish in the A-Main (I was edged out by another SP-10 with a left-turn-only chassis plate), I was comfortable with the car's characteristics. It took me a while to get used to its awesome turning capabilities and the high cornering speeds generated by Twister and New Wave motivation, but I doubt you could find a car that handles better on smooth tracks.

I know what you're thinking! If this car is so great, why aren't more of them on the circuit? Unfortunately, the SP-10 doesn't run well on rough surfaces. The chassis' inherent stiffness and the free-floating damping system aren't popular, but Corally will soon release several updates that will make the car more competitive on the oval scene. The need for lighter chassis plates, sway bars (there's no tweak adjustment on this version), increased suspension travel and more replacement parts are just a few things that will be addressed. (Look for information on the updates in future issues of *Car Action*.)

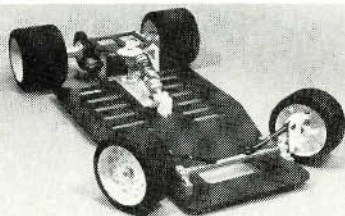
The Corally SP-10 is one of the finest-engineered cars on the market. If you're looking for a killer carpet car, this one could be your ticket to the A-Main. Of course, nothing beats a good maintenance program, stick time and a desire to win. But trust me—the SP-10 makes success that much easier!

*Here are the addresses of the companies mentioned in this article:

Corally, distributed by Du-Mor, Inc., 1002 Union Landing Rd., Cinnaminson, NJ 08077.

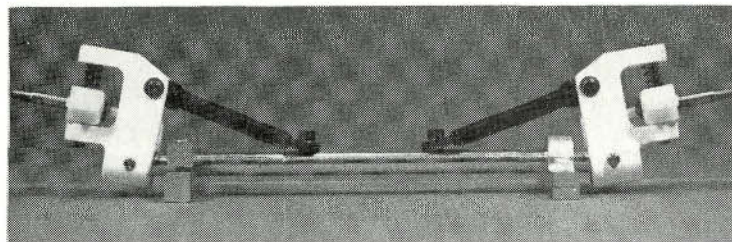
(Continued on page 127)

CAMBER - CASTER - CAMBER



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CORALLY SP-10

(Continued from page 122)

Motion Graphics, P.O. Box 1590, Westminster, MD 21157.

Pro-Line USA, P.O. Box 456, Beaumont, CA 92223.
Bolink R/C Cars, Inc., 420 Hosea Rd., Lawrenceville, GA 30245.

Futaba Corp. of America, 4 Studebaker, Irvine, CA 92718.

NOSRAM; distributed by Du-Mor, Inc.

Twister Motors, 657 E. Arrow Hwy., Ste. H, Glendora, CA 91740.

New Wave Cells, Brooklyn Navy Yard, Bldg. 408, Brooklyn, NY 11205.

SCAT Racing Products, 20029 Labrador St., Chatsworth, CA 91311. ■

SHOTGUN

(Continued from page 84)

nential makes it easier for you to control the truck on straightaways, especially when the track is slippery. The compact receiver weighs only 1.25 ounces, and I used Airtronic's 94738 coreless motor servos, which respond quickly and are strong enough for any truck.

I chose Tekin Electronics' 411P speed controller. It has high-frequency response coupled with power feedback circuits that charge the battery. It also has torque control, which, for drivers like me who can't maintain that "fine-finger" throttle control, makes all the difference in the world. Slippery tracks are no longer a problem, because you can just dial down the amount of torque. The 411P can handle more than a whopping 480 amps continuous and a "spike" amp that's as high as the moon. This is cool, because I use a Quarter Flash* 17 Triple HTM (high-temperature magnets) series motor for power. Every off-road driver in the world knows you need to fight the heat, so this should make a screamin' combination!

Schumacher's clear-polycarbonate chassis cover fits like a glove and keeps all this high-tech hardware clean. It even has an air-intake vent to allow cooling air to reach the electronics. On the wheels, I used Schumacher Blue Naturals truck tires: Vee-4s up front and Vee-2s in the rear. The one-piece rims make it difficult to mount the tires, but I didn't have to glue the tires in place because they fit very tightly.

I had to make one modification to the Shotgun. It's made to accept a stick battery pack that runs from the rear bulkhead to the forward battery mount, but I only had saddle packs. Using a set of Pure Tech* battery-mounting straps, I changed the positions of the radio and the speed-controller equipment to allow the use of

(Continued on page 130)

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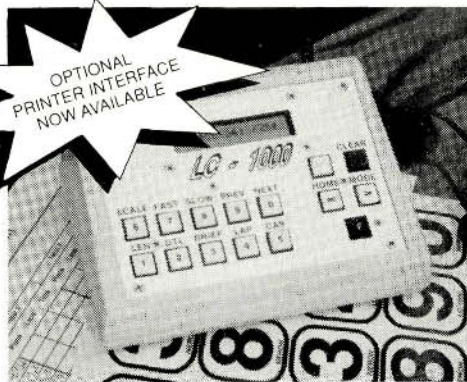
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TRUCK STOP

by DAVE SPROUL

Ain't nothing like the real thing



The 1988 TNT National Champion truck, now sporting 1990 sheet metal, stands proudly in the center of the shop.

THIS MONTH, I'll take you on a tour of the most famous Chevy monster truck—Everett Jasmer's USA-1! I realize that some of you couldn't care less about full-scale stuff, but I also know that many of you love full-scale racing of all types. I've been a "motor head" for as long as I can remember, and walking into Mr. Jasmer's shop was quite an experience for me. Not only were his two USA-1 monster trucks there, but also the supplies, equipment and hundreds of parts that

keep these monsters running.

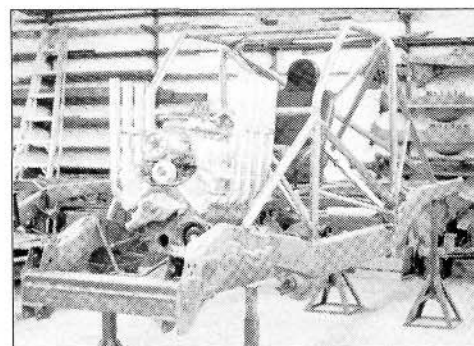
Located in Ham Lake, MN, about 30 miles north of Minneapolis, the USA-1 facility boasts an area of 11,000 square feet. (They moved there in October '89 from a much smaller building in Spring Lake.) As we walk through the front door, we see evidence of Mr. Jasmer's other business—Off-Road Specialties—and we see a showroom filled with the myriad accessories and parts that make 4x4 enthusiasts drool. Off-Road Specialties offers everything

from roll bars to lift kits, and they'll install many of these products for you in their well-equipped workshop.

Mr. Jasmer's spacious office is decorated with mementoes of his illustrious 4x4 career, including photos from the early days of monster trucks. From there, we move on to the shop—and what a shop it is!

Parked in the middle of the garage area, alongside the current 1990 version

(an update of the 1988 TNT champion truck), is the original 1970 USA-1. Complete Chevy truck frames and the new, one-piece, fiberglass bodies being used on USA-1 number three hang from the ceiling. The trucks are surrounded by 66x43x25-inch Goodyear Terra tires (new!), new two-piece aluminum wheels, sets of various 44- and 48-inch off-road tires, spare racing transmissions and transfer cases and more 5-ton military axles than I've ever seen in one place! In the corner, we see the beginning of USA-1 number three. A K3500 Chevy frame will be fitted with a new roll cage and one of the new fiberglass bodies. The driver seat is in the center, directly behind the engine. They haven't yet decided on the suspension system, but I'm sure it will be competitive!



A new truck frame awaits the suspension and body. Note the 5-ton military axles hanging on the rear wall!

As we look around the shop, we see the tools and equipment that are used to make and service these monstrous trucks. Drill presses (I counted four), a hydraulic press, a sheet-metal bender, a bead roller, cut-off saws, sanders, torches, a Mig welder, a lathe—the list could go on! This is a metal-worker's paradise.

In a small room off the shop (what Mr. Jasmer calls the "clean room"), sit three new, big-block, Chevy racing engines—all ready to be dropped into a truck if the need arises. In another room, we find a host of spare parts supplied by Chevrolet (one of the USA-1's



A complete set of new 66x43x25-inch Goodyears! See the 1970 USA-1 in the background.

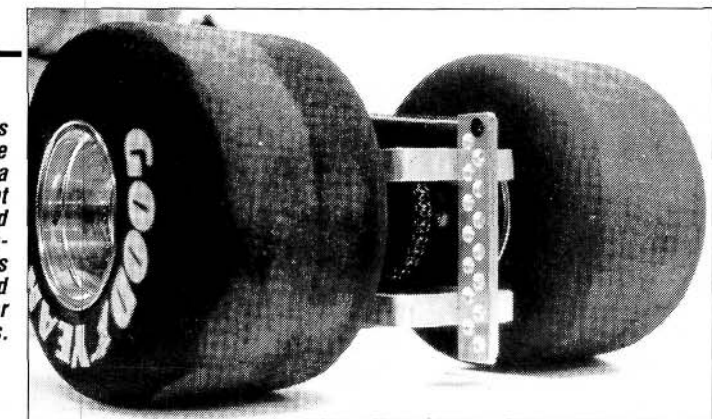
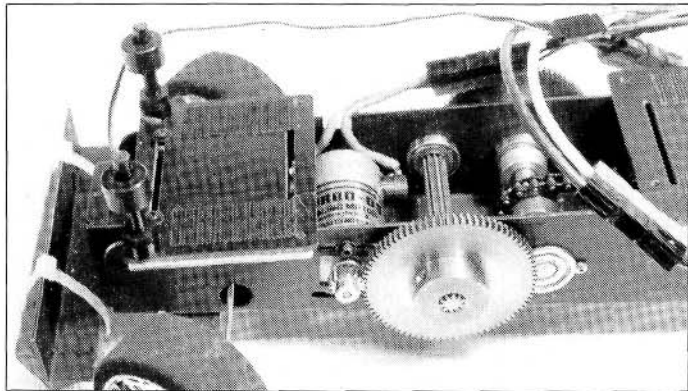
sponsors). From starter motors to 454ci marine engine blocks, it's all there, awaiting its turn to be bolted onto the famous USA-1.

The USA-1 operation is impressively neat and professional, and Mr. Jasmer is quick to recognize his sponsors—Chevrolet and True Value Hardware—and their dedicated support of his racing efforts. It's clear from the display at his shop, which includes the model and a variety of ads and magazine articles, that Mr. Jasmer is also proud of Kyosho's 1/10-scale version of his truck. (I bet this article finds its way into his archives as well!) I thank Mr. Jasmer for the opportunity to tour his shop; it was well worth the trip!

HE'S A "BEELIEVER"

New on the R/C truck scene, let's look at a pulling-truck kit from Twinn-K*. Called the "Beeliever," it comes partially assembled as a rolling-chassis-type kit.

Its drive train consists of very heavy-duty steel gears, ball bearings and a roller-chain final drive. Its rear axle is of 3/8-inch steel that rides on ball bearings, and aluminum hubs are used to mount the Clod Buster wheels and Twinn-K foam tires. Up front, there's a straight axle with wheels, tires and a steering linkage. The kit includes graphite radio and battery trays, body mounts and Parma's* stretched Chevy puller body. To complete the kit, you'll have to buy a 2-channel radio, batteries, a motor and a speed controller.



The business end of the Beeliever: a multi-point hitch and Twinn-K green-dot foam tires on modified Clod Buster rims.

It isn't too difficult to assemble the Beeliever, but I had problems trying to fit everything on the mounting trays while still ensuring that the body would fit. My difficulties were probably caused by the large "weight boxes" that I use for extra ballast. My solution was to drill four holes in each side of the chassis and to "tie-strap" the battery packs to the sides. This allowed more room on top of the chassis for the weight boxes, radio, etc. I chose AstroFlight's* Pullmaster I motor and connected 14 SCR cells through a mechanical speed controller.

BEYOND "BEELIEF"!

My Beeliever weighed 15 pounds, and I was set up for Open I competition. My first pulling event was in Indianapolis on a carpet track, and the first round quickly proved that the Beeliever needed more weight on its front end. After I had moved weight around and lowered the hitch hookup, in the next round, the truck took the sled out for a full pull. In the pull-offs, though, we didn't fare as well, as the Bee lost trac-

tion at about halfway. At the next pull, I'll increase the gear ratio to get more momentum off the line. The Beeliever is geared at 120:1 with a 16-tooth pinion, but pinions can easily be changed to suit track conditions.

Overall, this is one heavy-duty machine that will be competitive in either the Sportsman or Open I classes.

POWER HUNGRY

I've just heard from PDI* that its new Electro speed controller will soon be available. This new unit is less expensive than the Hydro-Zeta, but it can handle more power. The "Silver" version is rated at 180A continuous and 600A surge, and it can handle six to 16 cells. The "Gold" version is rated at 360A continuous and 995A surge. The Electro's other features include an on/off switch, a watertight case, automatic thermal shutdown, low resistance, a built-in "de-glitch" filter, neutral and full-speed adjustments and a 90-day warranty. I'm sure it will be popular with truck pullers in all classes. The suggested list prices?—\$169.95 (Silver) and \$249.95 (Gold).

Well, that's all for now. See ya next time!

**Here are the addresses of the companies mentioned in this article:*
Twinn-K Inc., P.O. Box 31228, Indianapolis, IN 46231.
Parma International Inc., 13927 Progress Pky., North Royalton, OH 44133.
AstroFlight Inc., 13311 Beach Ave., Marina Del Rey, CA 90292.
PDI, 16922 N.E. 124th St., Redmond, WA 98052

The new Twinn-K Beeliever pulling truck uses heavy-duty steel gears and a roller-chain final drive. A large steel spur gear mates with a pinion gear. (A 16-tooth pinion yields a 120:1 reduction.)

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SHOTGUN

(Continued from page 127)

saddle packs. This also moved the truck's balance point forward slightly—no big deal. Schumacher also offers saddle-pack battery holders, but I just happened to have the Pure Tech straps handy.

Kevin Brister artfully painted the Shotgun's body with Pactra* Racing Paints. With everything assembled and the body painted, it was off to the track.

THE SHOTGUN GOES OFF...

At the track, I discovered that I had chosen the wrong oil for the front shocks (the truck's front end dove in the corners), so I replaced it with 30WT oil. I also had trouble adjusting the shocks properly with the kit-supplied spacers. The spacers fit on the shock body to compress the springs, but each adjustment is only as large as the thickness of a spacer, so I had to use a lot of them. Locking collars would be preferable.

When it's dialed-in, the Shotgun is a delight to run, and it has incredible punch off the line. Now, I know that some of this is because of its hot motor, but even with a stock motor, the Shotgun still pulls a holed shot on everything at the track.

The Shotgun handles very well. You don't have to back off for jumps; just stay punched. The truck's cornering is very controlled, and it gives you plenty of warning before its rear end breaks away. You must hit jumps dead on. If the Shotgun doesn't hit them on the nose, it twists slightly when airborne. Just watch out for this; the truck can twist enough to end up on its side—and then some! Small jumps aren't a problem—just the large ones.

HOP-UP HOOPLA

I'd be remiss if I didn't mention Schumacher's hop-up parts for this killer truck. After my initial tests, I installed the Super Diff kit (part no. U745S). It re-

(Continued on page 136)

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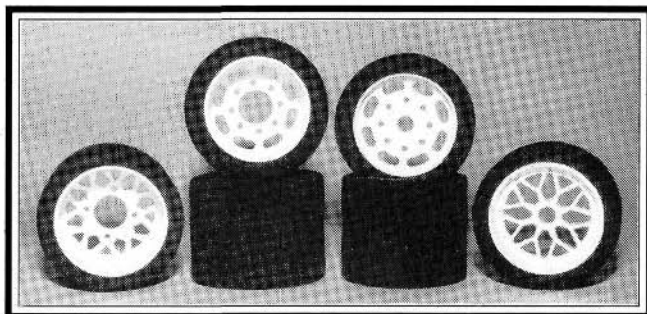
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Holeshot Racing Products

SHOTGUN

(Continued from page 130)

places the nylon diff-ring carrier with an aluminum one that can withstand the absolute torture of running with a poorly adjusted diff. Usually, when a diff slips, the heat that's generated spoils your day, but this isn't a problem with this diff kit.

I also installed the new slipper clutch (part no. U770R), which fits on the main spur gear. This clutch prevents the diff from slipping, and it enables you to control the power that hits the ground. With the slipper clutch installed, the stock gear cover doesn't fit, but that's a small price to pay. I also added a Pro shock tower (part no. 1027H), which is stronger and extends farther down the rear bulkhead than the stock one. With these goodies in place, I headed to the nearest race to see how the truck would handle *real* competition.

At the NORCCA/Mickey Thompson Grand Prix Series Race in San Diego, CA, Kevin Brister and I entered the truck in two classes. Kevin took it to the Super Stock Class and, with a stock Quarter Flash motor, the Shotgun qualified in 2nd place out of 40 drivers. It finished the A-Main in 2nd place, too.

In the Modified Class, the Shotgun finished in the same position, despite having to duel against modifieds with 7-cell packs. It finished 2nd in the qualifer and 2nd in the A-Main. Now that, gentlemen, is proof that the Shotgun is a winner—ain't no joke!

The Shotgun is a great off-road racing truck. With the Airtronics radio, the Tekin speed controller and the Quarter Flash motor, it will be tough to keep the Shotgun out of the A-Main. In a world where everyone claims to be selling a racing truck, the Shotgun is, without a doubt, a true racing truck!

**Here are the addresses of the companies mentioned in this article:*

Schumacher USA, Inc., 6302 Benjamin Rd., Ste. 404, Tampa, FL 33634.

Airtronics, Inc., 11 Autry, Irvine, CA 06401/

Tekin Electronics, 970 Calle Negocio, San Clemente, CA 92672.

Quarter Flash Motors, 1143 N. Winstel, Tucson, AZ 85716.

Pure Tech, P.O. Box 854, Tarzana, CA 91357.

Pactra, Inc., 620 Buckbee St., Rockford, IL 61104. ■

FUSION SPEED RC10

(Continued from page 96)

try them. As long as there isn't too much loose dirt on top, they work very well on the hard stuff. I was surprised by their

(Continued on page 139)

FUSION SPEED RC10

(Continued from page 136)

performance, and I plan to use them a lot.

I'm not going to tell you that my new car blew all the others away on its first time out. I'm certain, however, that when I've had more practice, it will be a contender. The chassis is strong, and because of the way it's joined to the body, dirt has been kept out. I like that! You might not want to try all the stuff I did, but if you're looking for a light, durable chassis that can protect your radio gear, this is it.

*Here are the addresses of the companies mentioned in this article:

Horizon Hobby Distributors, 3102 Clark Rd., P.O. Box 6029, Champaign, IL 61824.

Associated Electrics, 3585 Cadillac Ave., Costa Mesa, CA 92626.

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Tecnacraft, 1355B Dayton St., Salinas, CA 93901.

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(Continued on page 155)

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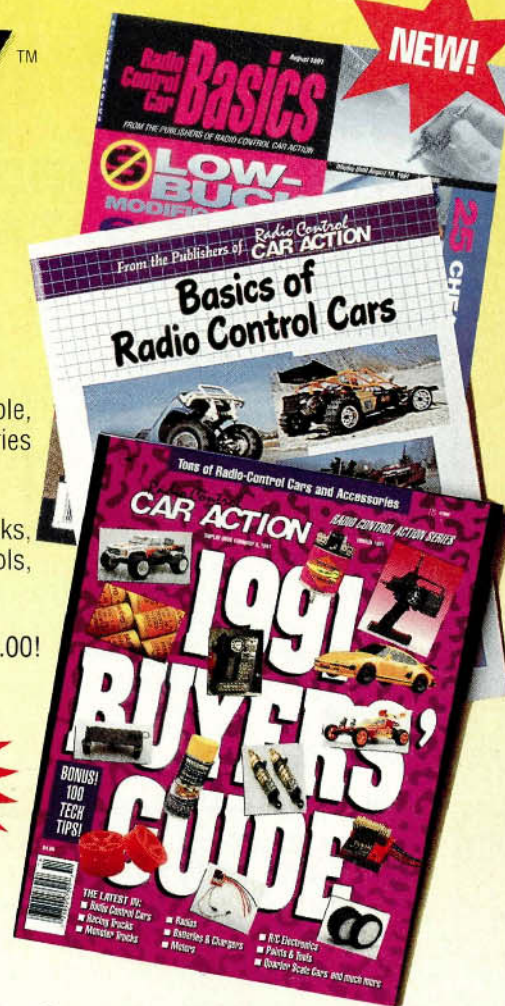
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BASICS OF DIFFERENTIALS!

HAVE YOU ever wondered exactly what a differential is? If you've assembled an R/C car or a truck, you've probably built or installed a differential, but you might not know how it works, or why you need one in the first place!

A differential allows the inside wheel of a cornering vehicle to rotate independently of the outside wheel. In a turn, the wheels on the inside of the car can't possibly rotate at the same speed as the outside wheels, so somebody had to invent a way to compensate for the difference in speed between them; hence, the differential. Without a differential, the inside rear tire would be dragged through every turn. R/C cars use two types of diff (differential is such a formal word):

- the gear diff, which is standard equipment on most entry-level cars and trucks (e.g., the Tamiya Blackfoot and Kyosho Raider)
 - the ball diff, which is used by many racers because it provides superior handling.
- There are pros and cons to both types.

The more smoothly and easily the diff

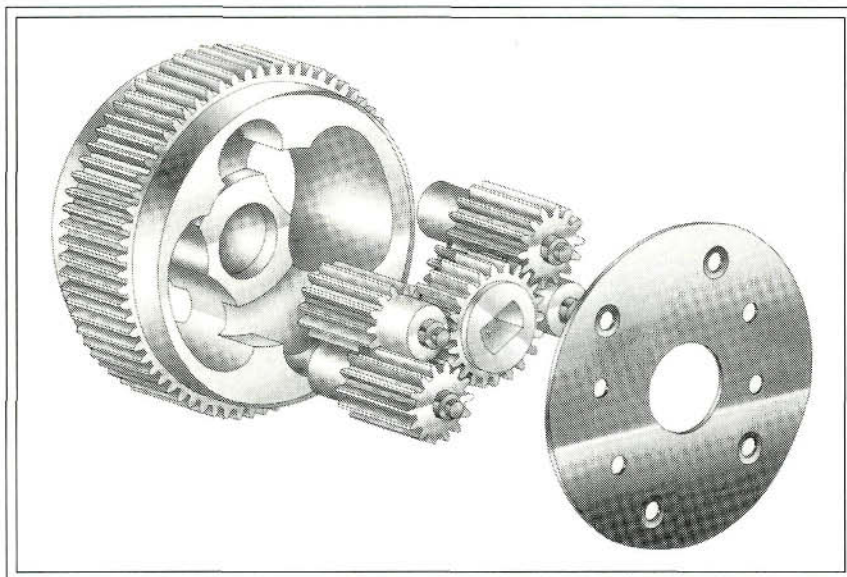
by FRANK MASI

works, the better a car will corner. A car that's equipped with a gear diff operates with minimum friction because the beveled gear is connected to the transmis-

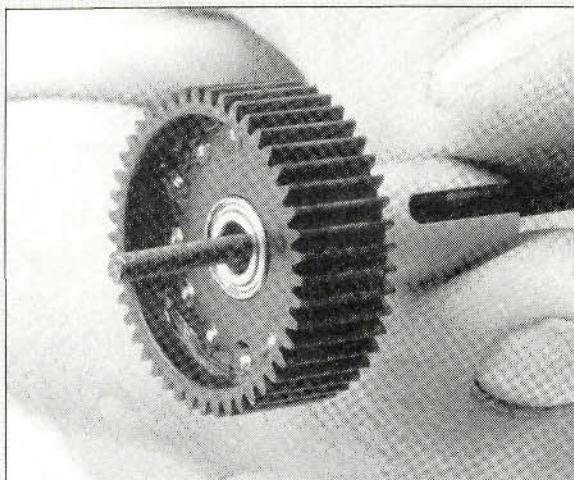
sion outdrives, one for each wheel. These gears are then joined by two smaller counter gears (or four, if it's the planetary type) that cause the sides of the diff to rotate in opposite directions. The advantage of a gear diff is that, while cornering, each wheel turns at a different speed with minimum resistance. This lack of resistance, however, makes the gear diff unsuitable for racing on all but the smoothest tracks. Whenever one of the drive wheels leaves the ground while cornering or going over a jump, the wheel that remains on the surface will lose power until the other side comes

down. The result is a sudden surge in acceleration, and this makes handling erratic.

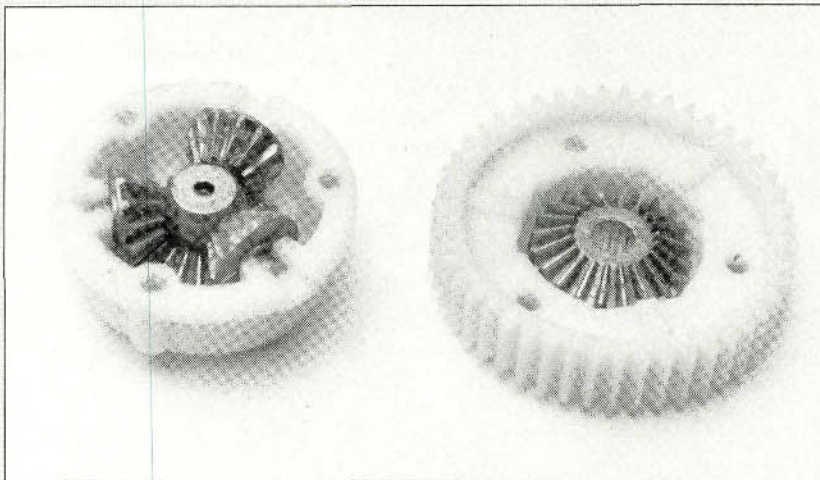
When you apply throttle, the speed controller sends power to the motor; the motor then spins the transmission, which rotates the wheels. With a gear diff, the motor is directly connected to the wheels, and nothing in the drive line can limit the initial torque that's produced when you punch the throttle. If you're running on a slippery surface, the rear wheels will often try to overtake the front wheels. Like many



With the planetary gear diff, the small gears orbit around the larger center gear; hence, the name "planetary." Like the bevel-gear diff, there's no slip.



The ball diff has two circular diff rings that ride on small steel balls. The tension must be adjusted correctly—with too little tension, the balls won't touch the rings fully and no power will be transferred; with too much tension, there's no diff action or slippage. A little slip is desirable.



With a basic bevel-gear diff, two circular gears ride on three, small, cone-shaped gears. Diff action is created by the counter-rotation of the two circular gears around the cone-shaped ones. There's no slip in this system.

R/Cers, I started with a Tamiya Hornet (equipped with a beveled-gear diff), and I know how frustrating this oversteering can be.

To rectify this problem, companies that produce R/C vehicles for competition have traditionally included ball diffs rather than gear diffs in their kits. Although the ball diff and the gear diff both do the same job, under certain conditions, a ball diff works better; it can be adjusted to allow for a small amount of slippage under acceleration, and this prevents wheel spin.

Although they vary in appearance, all ball diffs have the same basic components: a center gear (or belt pulley) with holes for the diff balls; two diff halves with or without separate drive rings that sandwich the diff balls of the center gear or pulley; and a thrust bearing. The diff halves are assembled around the center gear and secured with an adjusting nut and bolt, the head of which rides on the thrust bearing. With pan-type on-road cars, the rigid axle is threaded at the diff end to take an adjusting nut. Tightening the adjusting nut changes the pressure that the drive rings exert on the diff balls, and this gives you control over the limited slip allowed by a ball diff. A ball diff operates with considerably more fric-

tion than a gear diff, and this enables both wheels to remain under power, even if one side leaves the ground.

MAINTENANCE

For consistently good performance, you must maintain your differential. It's usually less expensive to replace a part that has worn out than a part that fails from lack of maintenance and neglect. If

bearing becomes gritty, since it's often less protected from the elements. I like a ratio of about two thrust bearing rebuilds to one main diff.

A good motor spray will clean both types of diffs; just make sure that it doesn't harm plastic. After cleaning the parts, lubricate and re-assemble them, and replace any that are worn or broken. Everyone seems to have a favorite diff

lube, so use whatever works for you. Use a good molybdenum grease on the thrust bearing. Don't use a conventional diff lube on gear diffs; lithium grease works better.

When you set a ball diff, never allow it to run with excessive slippage; this heats up the diff and causes premature wear and even damage. If you can't get good traction, examine the chassis setup, the tires, and if necessary, invest

in a slipper clutch.

Those who race cars and trucks usually opt for a ball differential instead of a gear unit (although MIP makes an RC10 gear-diff tranny that also has a slipper clutch for the RC10). If, however, you're like many R/C enthusiasts who enjoy running their machines anywhere they can, be it in the street, or in the backyard, giving the cat a good workout (R.I.P., Fluffy), the gear diff is perfectly adequate. ■

EVERYTHING YOU EVER WANTED TO KNOW ABOUT DIFFS BUT WERE AFRAID TO ASK

you keep a gear diff clean and well lubricated, you can't go wrong. I'm not saying it will last forever, but many a gear diff has outlasted the car!

Ball diffs, on the other hand, require constant attention. The diff, thrust-bearing balls and the washers they ride on are the most important parts of any ball diff, and they're the most likely to wear out. When their action becomes rough or gritty, ball diffs should be at least partially rebuilt. Usually, just the thrust

FUSION SPEED RC10

(Continued from page 139)

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TRACK DIRECTORY

In keeping with our constant efforts to help foster the growth of the radio-control car hobby, we print this track directory intermittently to inform modelers where they can race and exchange ideas. If you'd like your track listed, send the track's name, address and phone number to **R/C Car Action Track Directory**, 251 Danbury Road, Wilton, CT 06897. We'll list as many clubs as space allows.

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(Continued on page 162)

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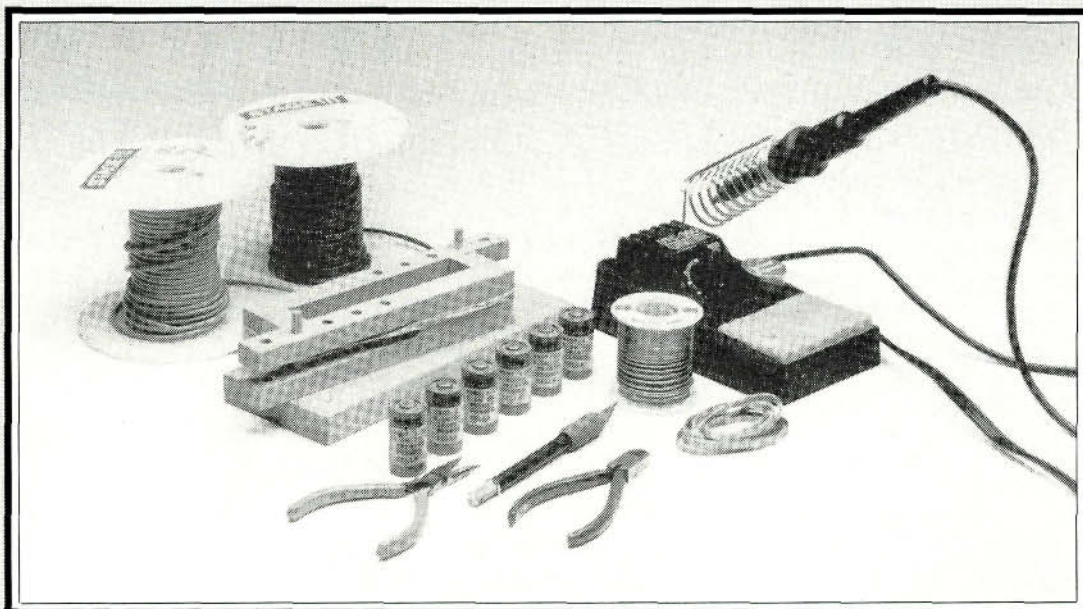
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BY STEVE POND

BATTERY ASSEMBLY BASICS

A STEP-BY-STEP GUIDE TO ASSEMBLING YOUR OWN BATTERY PACKS



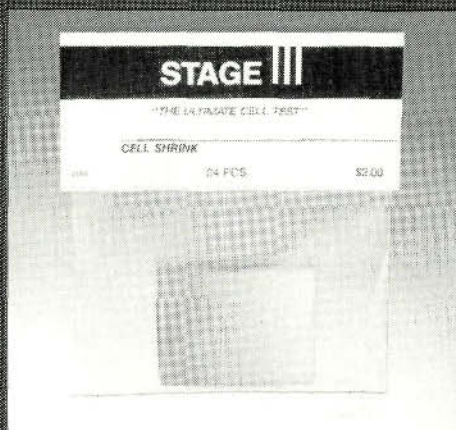
PHOTOS BY YAMIL SUEO

IN HIGHLY competitive circles, matched batteries have become the standard method of powering electric R/C race cars; they give you a competitive edge over battery packs composed

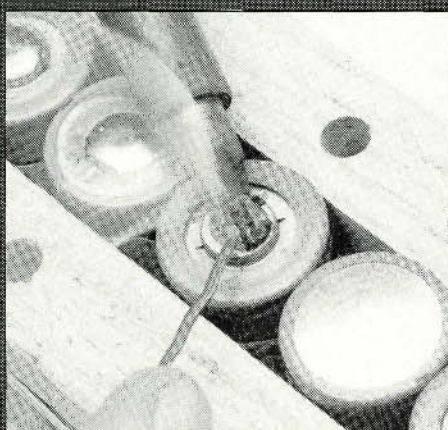
of randomly picked cells. The difference in performance between matched and unmatched packs, however, isn't as significant as you might think; part of preserving that competitive edge starts

well before the you charge the batteries.

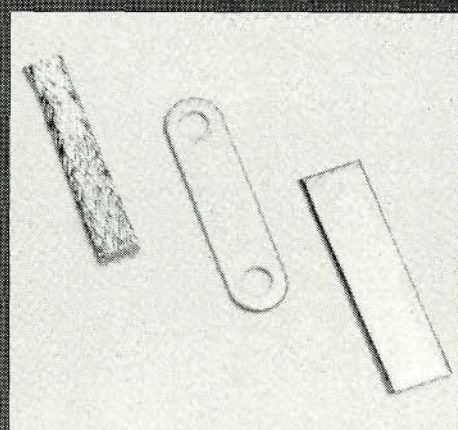
For the most part, matched packs are only available as unassembled groups of cells, and to ensure that you're getting the most from your batteries, it's impor-



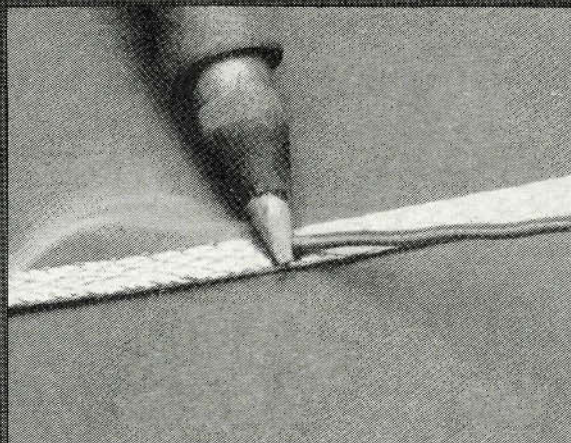
1. Stage III single-cell shrink-wrap provides an extra layer of protection for your batteries.



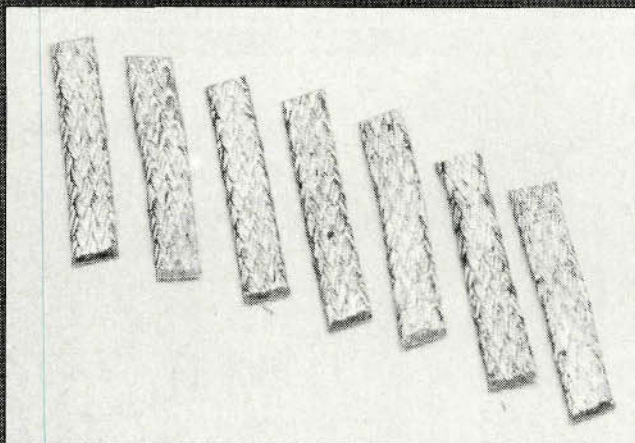
2. The cells are exposed to less heat if you apply solder to the ends of the cell before you attach the shunt wire.



3. You can connect cells with a variety of shunts and battery bars. Since they all perform the same job, it's a matter of preference.



4. To make braided battery shunt wire easier to cut and handle, apply solder before you attach it to the cells.



5. For a standard 6-cell pack, you'll need five sections of shunt, plus two additional sections for soldering tabs if you plan to hard-wire.

tant to assemble them correctly. Proper battery assembly starts with the right tools, the most essential of which is a powerful soldering iron. Since prolonged exposure to heat can damage Ni-Cd batteries, use an iron that's rated at 40 watts or more (e.g., the Ungar* Race Station 300) so that you can solder quickly.

Although not essential, a battery-assembly jig is helpful, and it quickly pays for itself if you plan to assemble several packs. Battery jigs are available in many configurations, and I've found the one from J.D. Modelworks* to be the most versatile. It's made of wood so that it won't conduct electricity, and unlike a plastic jig, it won't melt. You'll also need needle-nose pliers, wire cutters, a hobby knife, heavy-gauge wire, appro-

priate connectors, battery shunt wire or bars, and single-cell shrink-wrap (optional).

PREPARING THE CELLS

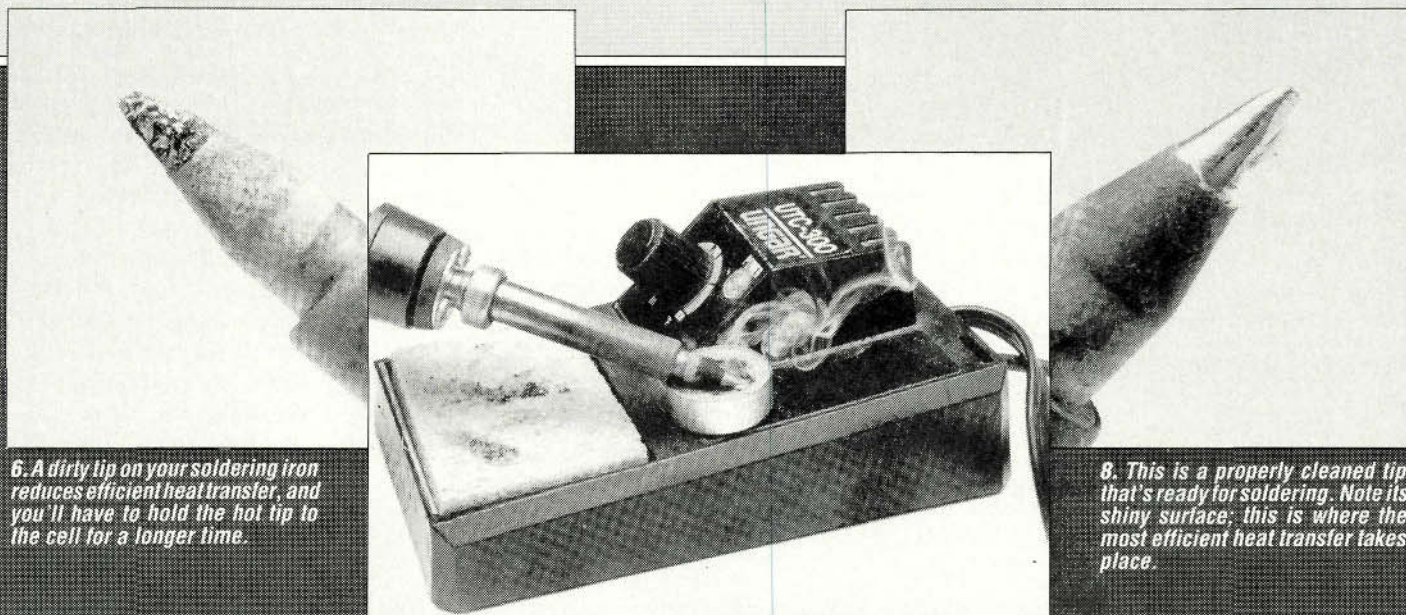
If the cells have tabs welded onto each end, remove them with pliers, and use a Dremel tool to smooth off what's left. The tabs are "spot-welded" to the cell—a process that bonds the tabs to the cell at four points by using very strong electrical current. Though the size of the tab may be sufficient to handle heavy current, the four, small, welded points that attach them to the cell may limit efficient current flow.

To protect the cells while you're racing, cover each with a section of shrink-wrap. Using shrink-wrap also lets you

dismantle and re-assemble the packs in another configuration. Sometimes, batteries covered with shrink-wrap make the fit too tight, and you'll have to assemble the packs without it, but I recommend that you use it, if possible.

If you "tin" (pre-solder) the ends of the cells first, you'll be able to solder the batteries quickly without juggling a section of shunt wire. Also, the cells will be exposed to less heat if you use this method.

You can use different types of shunt to connect the cells. The bar-type shunts made popular by Dan's R/C Stuff* and also available from Trinity* and Bud's Racing* require no preparation. The braided shunt wire, however, should be tinned before you begin to assemble the

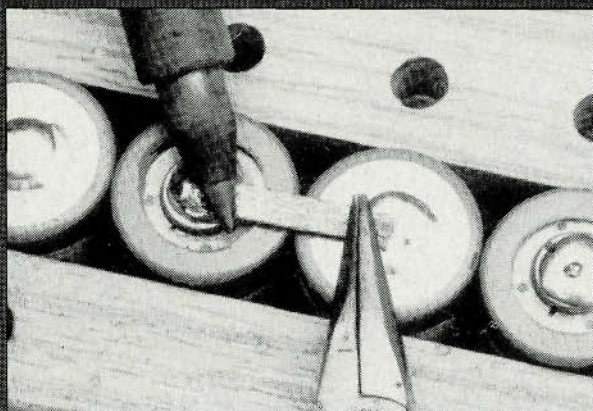


6. A dirty tip on your soldering iron reduces efficient heat transfer, and you'll have to hold the hot tip to the cell for a longer time.

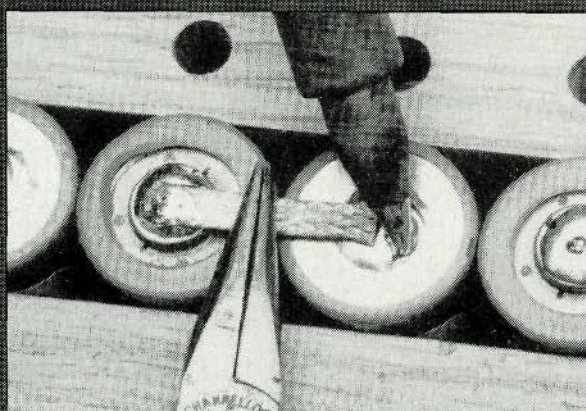
7. A tip cleaner/tinner does an excellent job of keeping the tip of your iron free of deposits. They're available from Radio Shack.

8. This is a properly cleaned tip that's ready for soldering. Note its shiny surface; this is where the most efficient heat transfer takes place.

BATTERY ASSEMBLY BASICS



9. When you solder the cells together, hold the shunt in place with a screwdriver or pliers. Apply only enough heat to make a good solder joint, then quickly remove the iron.



10. With one end of the shunt in place, move to the other side and, again apply only enough heat to ensure a good solder joint. Excess heat is bad for the cells, and it may disturb the solder joint at the other end of the shunt.

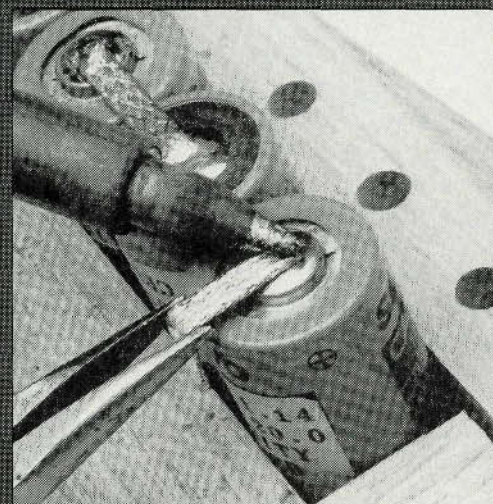
pack. Apply solder to a length of shunt wire. This will make it easier to cut it into 1-inch lengths and to make tabs for hard wiring. When the shunt wire is soldered to the cells, it also increases the strength of the pack.

Make sure that the cells fit in the chassis before you assemble the pack. Sometimes, the hard wiring tabs or the pack's positive and negative leads interfere with a part of the chassis. When you have determined that your configuration will fit your car, assemble the cells accordingly.

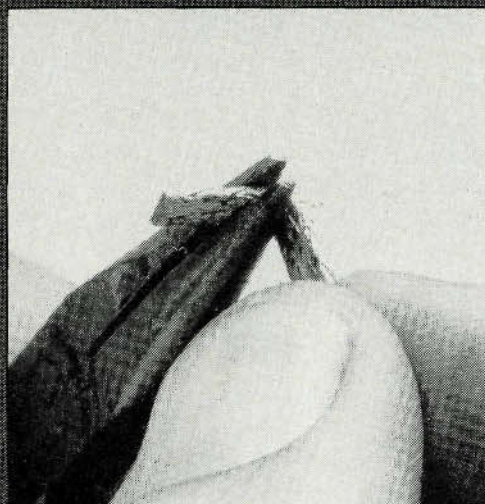
Place the cells in the battery-soldering jig. (If you don't have a soldering jig, glue the cells together or tape them in place.) Clean the tip of the soldering iron by quickly wiping it on a wet sponge, or use a tip cleaner (available from Radio Shack). A clean tip transfers heat more efficiently, and this

results in a cleaner, faster soldering job. Leave the positive (+) end of the cell open where the positive lead or hard wiring tab will be connected to the pack.

Now, solder a piece of shunt, or a

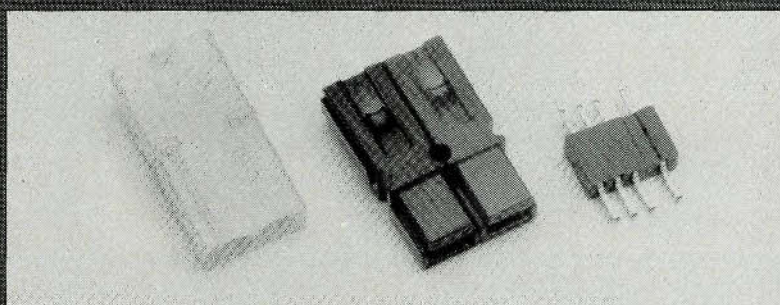


12. Solder the tabs to the remaining terminals on the pack. Apply them as you did the shunt wire, and make sure you position the tabs to allow clearance between them and the shrink-wrap.



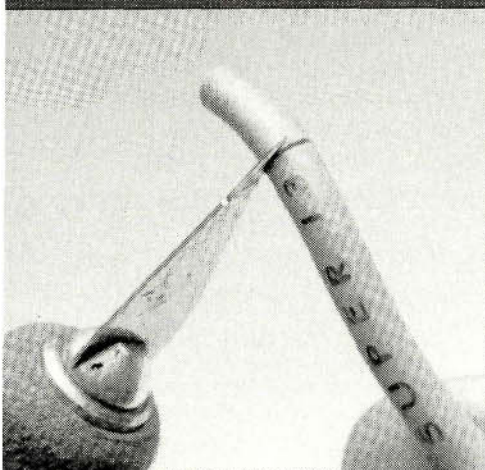
11. If you use hard wiring, bend the two extra sections of shunt to a 90-degree angle with needle-nose pliers.

13. These are three of the most popular connectors. Their range of performance varies, but each should be soldered to ensure the best connection possible.

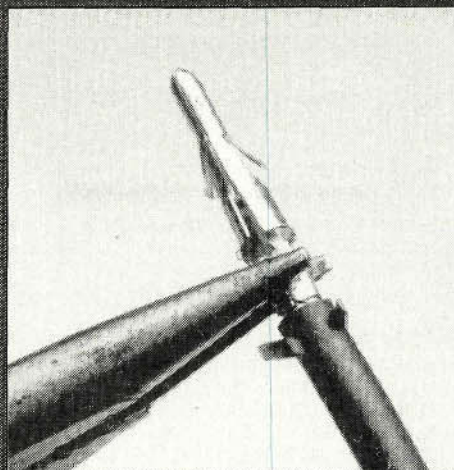


section of battery bar from the negative lead of the same cell to the positive lead of the cell next to it. Place the shunt across the space between the two cells, and hold it in place with a screwdriver.

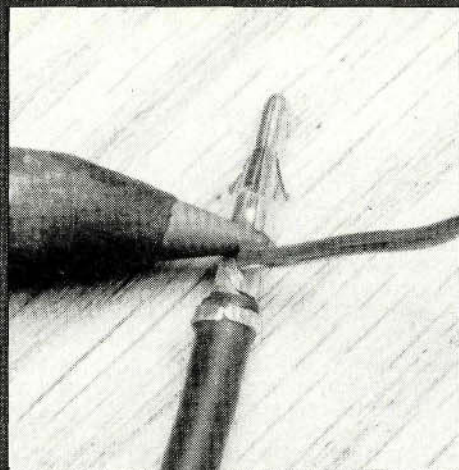
Work on one side at a time, and don't hold the soldering iron to the cell for too long. With one side of the shunt soldered into place, move over to the next side, and apply only enough heat to make a strong solder joint; don't let the solder melt across the length of the shunt. Repeat this



14. When you attach the wire to the pack, trim off a small piece of the wire's insulation and, as with the hunt wire, apply solder before you attach it to the cell.



15. Even with the Tamiya-style connectors, which are designed to be crimped, the pins should be soldered. Crimp them snugly with needle-nose pliers, then apply solder.



16. To protect your work surface from a hot iron and dripping solder, work over a piece of hardwood.

until each of the cells is connected. Leave the last negative terminal for the negative lead or soldering tab.

Always be sure that the solder on both pieces has melted sufficiently, then pull the tip of the soldering iron away while holding the pieces in place. It may take a few seconds for the solder to cool and solidify, so be patient. Even though the wire has an insulating coat, it can still burn your fingers, so hold the soldering tab or wire lead with needle-nose pliers.

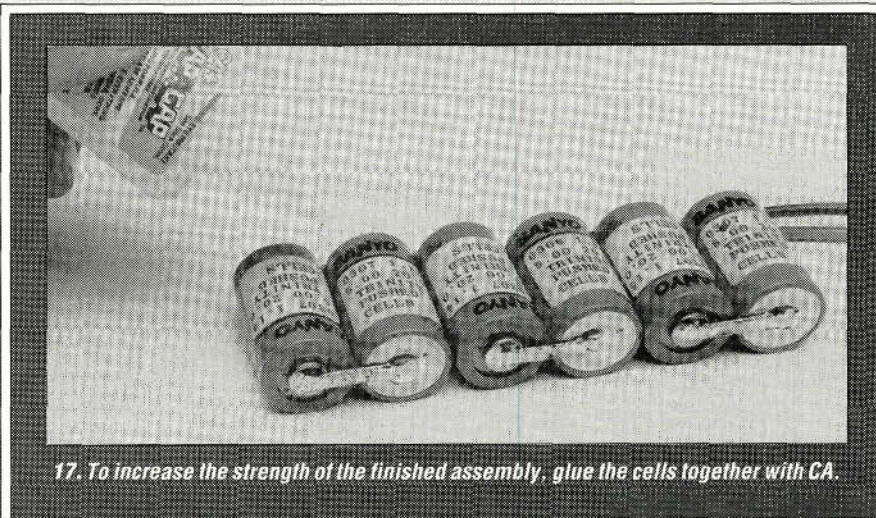
For packs that require a three-and-three configuration (three cells on one side of the car and three on the other), replace a section of battery shunt with a long section of insulated, 13-gauge

"jumper wire." To minimize voltage loss, keep the jumper wire as short as possible.

Packs that use hard wiring tabs should be connected to the cell in the same manner as the shunts that connect the cells. Connectors, even the crimp-on variety, should be soldered to the lead

connection. It's critical that you apply enough heat; otherwise, solder can build up, and this can make installing the pins in the connector housing difficult. With the connectors or tabs in place, battery assembly is complete, and you're ready to go racing!

(Continued on page 200)

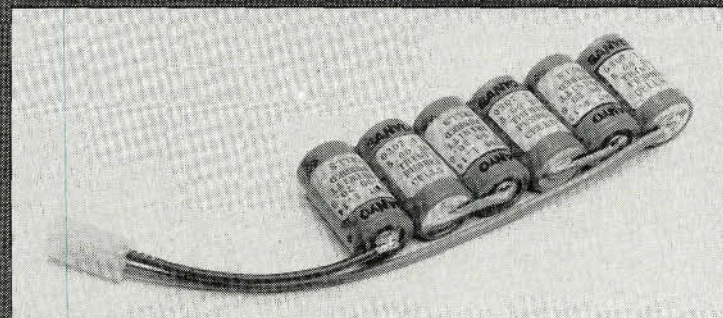


17. To increase the strength of the finished assembly, glue the cells together with CA.

wires. Failing to solder the crimp-style connectors will probably ruin all your hard work. The popular Tamiya* connector is a good example of a crimp-style connector that can be soldered to the lead wires for a more efficient connection. With the connectors' pins crimped into place, apply heat with a soldering iron, and allow a small amount of solder to flow into the connection.



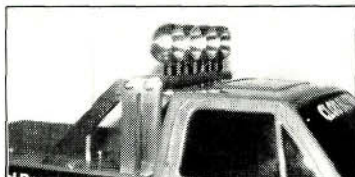
A finished pack assembled for hard-wiring. Soldered tabs should curve over the top of the cell away from other parts of the chassis. Make sure there's enough clearance between the tab and the protective shrink-wrap.



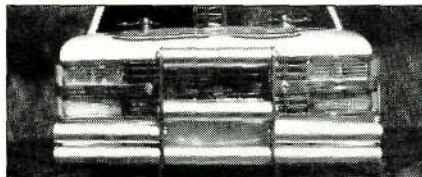
This pack was finished for use with a plug connector. Heavy-gauge wire makes the current flow as smoothly as possible. The connectors should be soldered to the wire for the most efficient connection.

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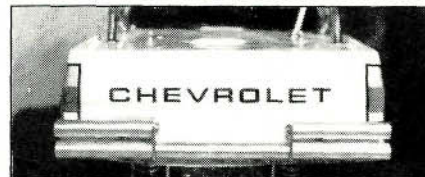
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40,000 RPM MOTORSpr. \$69.95
TRUCK PULL MOTORSpr. \$129.95
SPIKED RACING TIRESpr. \$19.95
TRUCK PULL TIRESpr. \$29.95
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(Continued from page 155)

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(Continued on page 166)

BUILD YOUR OWN R/C CAR FROM SCRATCH!

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CHARGER SPRINT CAR

Scratch-build your own 1/10-scale electric asphalt/carpet outlaw sprint car. This super-light sprung chassis is constructed of flexible music wire and features a changeable wheelbase that allows the use of many body styles. The Charger is fast and maneuverable.



DUSTER 540

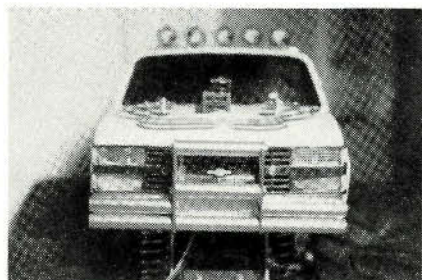
Get in on 1/10-scale carpet or on-road action inexpensively with this plan of Eric "Von" Goldschrafe's Duster 540. This car weighs less than three pounds and is constructed of epoxy/fiberglass board and aluminum. Use almost any running gear and suspension left over from junk 1/12- and 1/10-scale cars. Full-size templates make cutting out the chassis easy.

For each blueprint, send check or money order for \$9.95 plus \$1.75 for postage and handling. Foreign payment (including Canada and Mexico) must be made in US funds and drawn on a US bank, or by international money order. Send to:

Radio Control Car Action Plans, 251 Danbury Rd., Wilton, CT 06897.



WHAT'S NEW



ESP MFG. Universal Front Bumper

Constructed like the popular, aluminum, Clod Buster twin-tube front bumper, ESP's new Universal Front Bumper with brush guard can be mounted on almost any polycarbonate truck body.

Price: \$26.95

Part no. ESP006U

For more information, contact ESP Manufacturing, 7105 Virginia Rd., Crystal Lake, IL 60014.



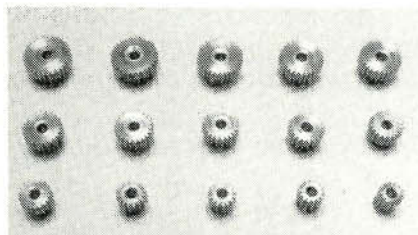
ESP MFG. Universal Twin-Tube Rear Bumper

ESP's Universal Twin-Tube Rear Bumper has a new design that allows it to be mounted on most polycarbonate truck bodies.

Price: \$14.95

Part no. ESP014U

For more information, contact ESP Mfg., 7105 Virginia Rd., Crystal Lake, IL 60014.

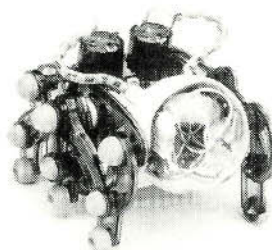


TOP GEAR MFG. Super Pinions

Top Gear Mfg. now offers precision-machined, titanium-nitride-coated gears in 32 pitch (9-20T), 48 pitch (13-30T) and 64 pitch (18-40T). They're coated with more than five times as much titanium nitride as others on the market, and the ultra-hard (RC85), self-lubricating coating will make the gears run with 44 percent less friction than uncoated gears, so they'll last much longer.

Prices: coated—\$3.95 each; \$17/5; uncoated—\$2.50 each; \$10.50/5.

For more information, contact Top Gear Mfg., P.O. Box 237, N. Ridgeville, OH 44039.

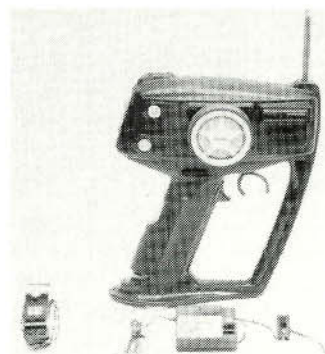


OWi Spider Robot

Offered by the Movit division of OWi Inc., Spider is a new battery-operated robot kit that demonstrates the principles of optical sensing and walking. A clear plastic housing displays the electronics that provide directional control: six legs driven by crank motion propel the robot, and an infrared beam and sensor detect obstacles in its path and change its direction. You can finish the educational, red and smoke-colored Spider kit using basic hand tools. Like all Movit kits, the Spider demonstrates the principles behind robots of all sizes, including large industrial models.

Price: \$75.95.

For more information, contact OWi Inc., 1160 Mahalo Place, Compton, CA 90220.



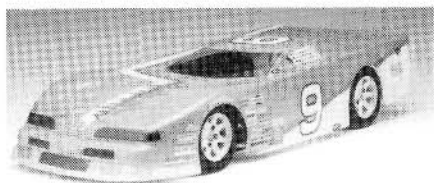
ALTECH MARKETING Technisport AW-75 MK-III Radio

This transmitter is designed for true hand comfort. The grip is firm, yet easy on your wrist; your index finger will easily reach the speed controller's trigger; and the steering-rate adjuster is conveniently located above your thumb. To prevent them from being moved accidentally, the trims for steering and throttle are recessed, as are the on/off switch and both servo-reversing switches. The large battery meter keeps track of your battery voltage. The recessed, collapsible antenna is near the trigger guard; and the built-in transmitter charging jack makes converting to Ni-Cds much easier. The BEC receiver is compact, light, sensitive and highly selective. The new AS-11 servos are slightly smaller than other popular servos, yet they still deliver a strong 42 ounce/inches of torque.

The Acoms Technisport AW-75 MK-III, 2-channel, pistol-grip wheel R/C system is available only on 75MHz.

Part no. HU168

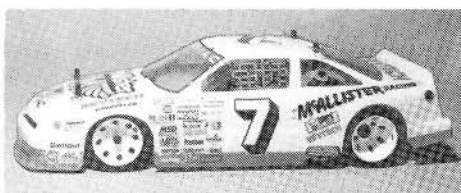
For more information, contact Altech Marketing, P.O. Box 391, Edison, NJ 08818.



CUSTOM WORKS Pro-Comp Dominator Kit

The best 4WD dirt-oval car in the business just got better! Direct from Custom Works' oval office comes the Pro-Comp Dominator. This kit includes all the after-market components used by Custom Works team drivers to win more than nine national championships! The Pro-Comp kit is based on the same high-quality parts as the standard Dominator, and it also has titanium suspension pins and shock pins, a Pro-Mod Thunderbird body, foam tires mounted on Custom Works' Cyclone wheels, titanium turnbuckles, Pro suspension arms, a sway-bar kit, a wing-mounting kit and a universal bumper.

For more information, contact Custom Works, 3720 Easton Dr., #7, Bakersfield, CA 93309.



McALLISTER RACING Winston Cup Stocker Body

McAllister Racing now offers a narrow version of the '91 Pontiac Winston Cup Stocker Body for those of you who are rushing out to get the latest narrow 10LTO. Even industrious R/C racers who have hammered out their own narrow chassis from scratch will love the accurate scale look of this body, and it's also available as a pro stock with an aero scoop.

Part nos. B-149 (stock car); B-150 (pro stocker).

For more information, contact McAllister Racing, 2245 First St., Unit 105, Simi Valley, CA 93065.

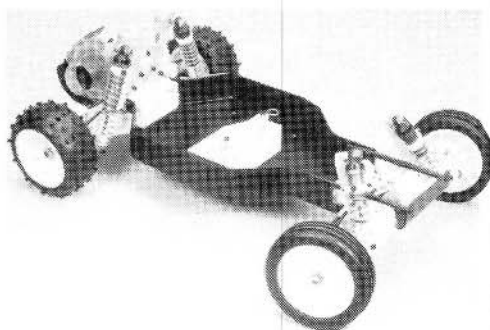


ASSOCIATED ELECTRICS Reedy Mr. Series Modified Motors

Here are a few more winners in Reedy's line of Mr. Series modified motors. With each new motor, there's an on-road conversion kit that includes extra springs and brushes for off-road and on-road versatility. All Mr. Series motors contain the new Ultra Torque Magnet, which provides a broader power band and makes the motor more efficient. The new modified motors are available in a variety of double, triple and quad winds.

Price: \$80

For more information, contact Associated Electrics Inc., 3585 Cadillac Ave., Costa Mesa, CA 92626.



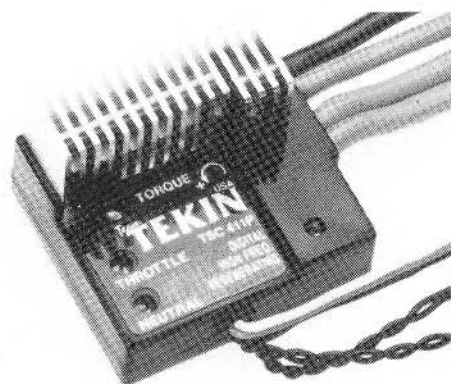
ASSOCIATED ELECTRICS Team Associated RC10 Team Car

This 1/10-scale off-road racing machine contains all Team Associated's latest speed secrets: Stealth transmission; new, black-anodized chassis; new, improved, hard-anodized, Teflon-coated racing shocks; wide-track front suspension; turnbuckle tie rods and links; zero-off-set front end; light, one-piece wheels;

new Viper Buggy body; ball bearings throughout; and universal dogbone/stub axles.

Prices and part nos.: \$305 (no. 6035)—RC10 Team Car with black aluminum-tub chassis. \$345 (no. 6036)—RC10 Team Car with graphite chassis

For more information, contact Associated Electrics Inc., 3585 Cadillac Ave., Costa Mesa, CA 92626



TEKIN ELECTRONICS ESC 411P

The new Tekin ESC 411P electronic speed controller has a circuit that recharges your batteries when you apply the brakes, and this gives your car a great "boost" when it comes out of corners. Even if you don't use the brakes, you'll notice your run time is as much as 20 percent longer. The linear motor-drive current enables your commutator to last two to five times longer. Whether you run stock or modified, you'll run faster, and your valuable motors will last longer. This new-generation electronic speed controller also features an electronically adjustable torque control that can help control wheel spin and give you the holeshot every time!

For more information, contact Tekin Electronics, Inc., 970 Calle Negocio, San Clemente, CA 92672.

Descriptions of new products appearing on these pages were derived from press releases supplied by the manufacturers and/or their advertising agencies. The information given here does not constitute endorsement by **Radio Control Car Action**, nor guarantee product performance or safety. When writing to the manufacturer about any product described here, be sure to mention that you read about it in **Radio Control Car Action**.

WHAT'S NEW



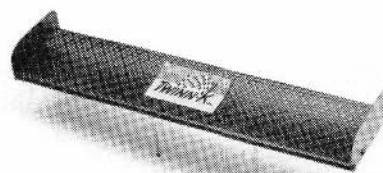
PANDA Peak Detector Charger

The Panda Pulse Current Peak Detector Charger quickly and safely peak-charges Ni-Cd batteries that have a 100mAh to 4,000mAh capacity and four to eight cells. The quick charge is followed automatically by a cell-equalizing trickle-rate (180mA) charge; an LED (light-emitting diode) indicates which mode the battery is in. An adjustable current rate from zero to 4.5 amps allows superior charging flexibility. With the Panda Peak Charger, even your lower-capacity, 4- or 5-cell receiver and 8-cell transmitter batteries can be safely peak-charged at reduced rates. (Radio system connectors aren't included; eight cells require a 16V DC input.)

Part no. 081305

Price: \$72.95

For more information, contact Global Hobby Distributors, 18480 Bandilier Circle, Fountain Valley, CA 92728.



TWINN-K Graphite Airfoil Wing

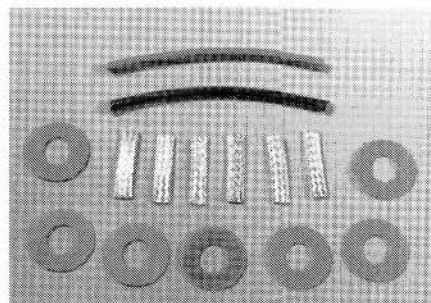
Twinn-K's revolutionary Graphite Airfoil Wings provide many advantages. Introductory models are available in kit form, so you can choose your favorite style of wing button. The kits include: an airfoil, side dams,

mounting screws and full instructions. The true-scale airfoil design has an absolute minimum drag coefficient and provides maximum downforce. It's made of woven graphite for incredible durability and a realistic appearance, and it's extremely light (the 1/10-scale version weighs only 1 ounce). These new airfoils are available in 1/10, 1/12 and 1/8 scale, and they can easily be adapted to virtually every car.

Part nos. 0890 (1/12 scale); 9996 (1/10 scale); 0760 (1/8 scale).

Price: \$22.95; \$24.95; \$24.95.

For more information, contact Twinn-K Inc., P.O. Box 31228, Indianapolis, IN 46231.



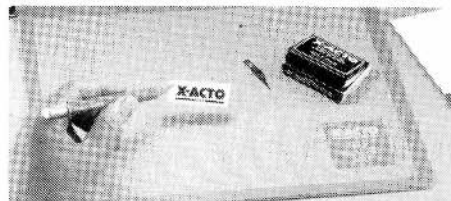
HOLESHOT Gold Braided Wire Battery Kit

Holeshot Racing has added 24kt gold-plated, braided shunt wire to its line of high-performance racing products. Precut in 1-inch lengths for easy soldering, this wire combines the extremely low resistance of braided shunt wire with the high conductivity and corrosion resistance of gold plating. The kit includes seven plastic battery insulators, 6 inches of 13-gauge wire, and six 24kt gold-plated, braided shunts—enough material to assemble one 7-cell battery pack.

Part no. 7000

Price: \$4.79

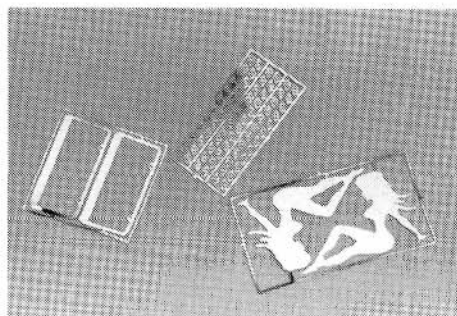
For more information, contact Holeshot Racing Products, P.O. Box 630, Canton, MA 02021.



X-ACTO Self-Healing Cutting Mats

X-Acto's Self-Healing Mats offer a cutting base with a resilient surface that seems to close around cuts as quickly as they're made. The gray opaque mat has a non-slip bottom that prevents it from sliding; the white translucent mat is 1.7mm thick. Both have a grid-lined surface that's scaled in 1/16-inch increments, and this aids in squaring and measuring accurate cuts. Self-Healing Mats are available in 9x12-inch, 12x18-inch, 18x24-inch and 24x36-inch sizes.

For more information, contact Hunt Manufacturing Co., 230 S. Broad St., Philadelphia, PA 19102.



DETAIL MASTER Detailing Accessories

Detail Master has introduced a line of detailing accessories for 1/10-scale R/C cars. These thin, stainless-steel parts have a bright finish, and they add a special accent to any concours or show body. Available are Custom Scripts Performance Scripts, License Plate Frames, Truckmates (Sitting or Reclining), Windshield Clips for stock cars, and Quick Turn Fasteners for drag cars and on-road cars.

For more information, contact Detail Master R/C, P.O. Box 1465, Dept. CA, Sterling, VA 22170.

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(Continued from page 166)

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Eric Zelman (703) 471-4499

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Ron Birkhead

CROZET OFF-ROAD RACE TRACK
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Chuck Seal (804) 823-4121 (days)
(804) 823-2099 (nights)

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6305 6th Ave., Tacoma, 98406
(206) 565-1935

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N. 1920 Sargent Rd., Spokane, 99212
Deanna Schram (509) 928-0503

S.A.R.C.A.R. CLUB
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(Continued on page 197)

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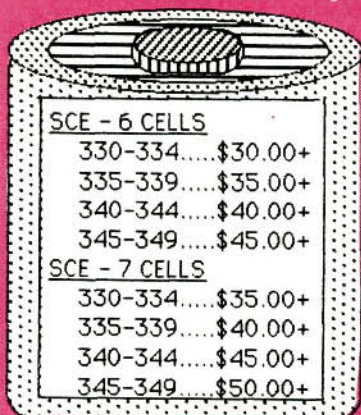
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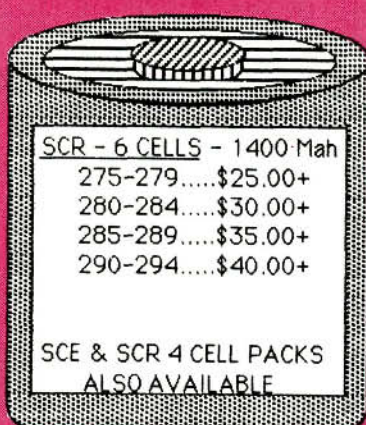


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(Continued from page 188)

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**TUNE IN NEXT MONTH FOR
MORE TRACK DIRECTORY**

BATTERY BASICS

(Continued from page 161)

Caution!—assembling your own battery pack can be dangerous. Soldering irons can get hot enough to cause serious burns, and Ni-Cd batteries contain combustible gases that can leak from the cells if they're improperly handled. Don't take the job of assembling your own packs too lightly. If you don't know how to use a soldering iron, recruit someone with experience. Learning by example from a well-trained person is the safest and most effective method.

*Here are the addresses of the companies mentioned in this article:

Ungar, distributed by Horizon Hobby Distributors, 3102 Clark Rd., Champaign, IL 61821.

J.D. Modelworks, P.O. Box 3542, Danbury, CT 06813-3542.

Dan's R/C Stuff, 9525C Cozycroft Ave., Chatsworth, CA 91311.

Trinity, 1901 E. Linden Ave., Linden, NJ 07036.
Bud's Racing Products, 1575 Lowell St., Elyria, OH 44035.

MRC/Tamiya, 200 Carter Dr., Edison, NJ 08817.

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ATTENTION

Track owners!



GET ON THE FAST TRACK!

We're updating and expanding our track directory, and you can get in on the action. Please fill out this coupon, and be sure the information is accurate and

complete. You must send in the coupon to appear in the new *Car Action Track Directory*, so please reply promptly. Remember: it's free!

TRACK NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

PHONE (REQ'D) () _____

(Check all that apply:) Length _____ ft.

- | | |
|-----------------------------------|---|
| <input type="checkbox"/> Indoor | <input type="checkbox"/> Concrete |
| <input type="checkbox"/> Outdoor | <input type="checkbox"/> Asphalt |
| <input type="checkbox"/> Off-road | <input type="checkbox"/> On-site hobby shop |
| <input type="checkbox"/> Oval | <input type="checkbox"/> AC power |
| <input type="checkbox"/> Banked | <input type="checkbox"/> Automatic lap-counting |
| <input type="checkbox"/> Dirt | <input type="checkbox"/> Food available |
| <input type="checkbox"/> Carpet | |

Return to Track Directory, Radio Control Car Action, 251 Danbury Road, Wilton, CT 06897.